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PUBLIC RESPONSE TO DIESEL ENGINE EXHAUST ODORS

Charles T. Hare
Karl J. Springer

FINAL REPORT

for

Division of Emission Control Technology
Air Pollution Control Office
Environmental Protection Agency
Contract No. CPA 70-44

Southwest Research Institute
8500 Culebra Road
San Antonio, Texas 78228

April 1971

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The project investigated public response to various levels of diesel exhaust odor.

A mobile laboratory called the "Sniffmobile" was set up in various areas including shopping centers in the San Antonio area. Volunteers were presented with calibrated samples of diesel exhaust odor. Over 90% of the participants found levels of this odor as experienced from a city bus objectionable.

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Approved:
John M. Clark
John M. Clark, Jr., Director
Department of Automotive Research

FOREWORD

This project was initiated by the Division of Motor Vehicle Research and Development, National Air Pollution Control Administration, Department of Health, Education, and Welfare (now the Air Pollution Control Office of the Environmental Protection Agency), 5 Research Drive, Ann Arbor, Michigan, 48103. The research program on which this report is based was performed by the Vehicle Emissions Research Laboratory of Southwest Research Institute, 8500 Culebra Road, San Antonio, Texas 78228. The sponsor's contract number was CPA 70-44, and the Institute's project number was 11-2794. Overall supervision of this work was done by Mr. Karl J. Springer, and supervision of the survey, analysis, and reporting phases was done by Charles T. Hare. The survey crew members were John Storment, Jim Chessher, Mae Saegert, and Gilbert Vargas. The project was begun on February 16, 1970, and was scheduled for completion on February 15, 1971, but it was extended 2 months for additional analysis and to permit review of the draft final report. At the onset of the program, Mr. Jeffrey L. Raney was the Project Officer, and he was replaced in this post by Dr. Joseph H. Somers effective September 17, 1970.

ABSTRACT

The objective of the project on which this report is based was to expand and refine information on public opinion of diesel exhaust odors. Most of the available data on the subject was generated by a precursor to this project which was conducted in 1969 and reported early in 1970. Modifications were made to the survey plan, questionnaire, and mobile odor evaluation laboratory used in the 1969 five-city survey, and public opinion sampling has been done. Five definable levels of diesel exhaust odors were presented singly to different groups of people, and an attempt was made to sample opinions on diluent air alone. All participants were drawn from the San Antonio metropolitan area, and were quota-sampled according to the latest data available. The methods are described, data are presented and analyzed, and possible applications of the results are outlined.

SUMMARY AND CONCLUSIONS

This research project was an extension of work performed under NAPCA sponsorship in 1969 which resulted in the report, "A Field Survey to Determine Public Opinion of Diesel Engine Exhaust Odor," dated February 1970. Changes made in the experimental plan as results of knowledge gained in the earlier work include:

(1) Only one odor was presented to each participant in the 1970 survey, as opposed to a series of three odors in increasing intensity during the 1969 survey, to eliminate possible "history" or "previous experience" effects.

(2) Five definable odor intensities were presented during the 1970 survey (nominal "D-2", "D-3", "D-4", "D-5", and "D-6" as defined by the PHS Quality/Intensity standards kit), as well as a sample containing no diesel exhaust, compared to three intensities during the 1969 survey.

(3) The participants were allowed to express their opinions of the odor directly in terms of objectionability in the 1970 survey, whereas their objections were obtained indirectly in 1969.

(4) The results of the 1970 survey are presented in such a way as to make quantitative evaluations of control technology in terms of public opinion feasible.

These modifications to the experimental plan made necessary certain mechanical changes in the Sniffmobile, including the addition of a spray chamber, a spray pump, a heat exchanger, and another refrigeration unit to control the humidity of the dilution air and to more effectively remove odors from it. Other additions were insulation on the duct carrying diluent from the front of the Sniffmobile to the rear, another charcoal filter system, and mechanical "stops" on the dilution control system to keep the odor level constant while on-site. The questionnaire was also revised to reflect the modified experimental plan, including such changes as deletion of references to multiple odors, deletion of questions not found relevant to the survey results in 1969, and addition of questions which solicited direct opinions of the odor presented in terms of objectionability and odor control measures.

The results of this project show that the modifications and changes made in the experimental plan and questionnaire were mostly for the better. Taking the modifications in the order just given:

(1) The presentation of only one odor to each participant did eliminate the "history" effect. This result is perhaps best shown by Figure 23, which indicates that response to the "D-4" and "D-6" odor intensities presented during the 1969 survey was increased by the previous experience of one or two other odors. The "D-2" response was higher during the 1970 survey, presumably because the public was more concerned and aware regarding air quality problems in 1970. Another factor which may be of importance is that participants in the 1969 survey may have adopted a noncommittal "wait and see" attitude about the first odor presented ("D-2"), since they knew they had yet to evaluate two other samples. This attitude would have forced the average response toward the "neutral" or 2.0 rating

(2) Presentation of five definable odor intensities worked rather well, and the only real fault in this format lay in the rather small samples which resulted. The five intensities helped fill the gaps in the previous (1969) data and confirmed the relationship between diesel odor intensity and odor objectionability using both a hedonic scale and direct questions. The tests run with no diesel odor were interesting, but they add little quantitatively to make the survey more useful. Most of the participants exposed to the "nominal D-0" intensity were confused since they really expected a stronger odor and the results reflect their confusion.

(3) The survey results also show that diesel odor objectionability increases with increasing odor intensity, although the linearity and the strength of the relationship both depend on the

manner in which the objectionability response is elicited from the participants. Figure 27 shows several ways of obtaining objectionability as a function of odor intensity.

(4) Application of results such as those shown in Figure 27, in conjunction with results of odor control technology evaluations performed for EPA over the past 5 years, is now feasible. Quantitative interpretation of such analyses yields useful estimates of the effectiveness of diesel exhaust odor control measures in terms of public opinion, but these estimates should be treated very carefully considering the variability which can occur, due to the way in which objectionability is calculated.

TABLE OF CONTENTS

Page

FOREWORD . . . . *ii*

ABSTRACT . . . . *iii*

SUMMARY AND CONCLUSIONS . . . . *v*

LIST OF ILLUSTRATIONS . . . . *viii*

LIST OF TABLES . . . . *x*

I. INTRODUCTION 1

II. OBJECTIVE 2

III. PREPARATIONS 3

- A. Revisions to the Questionnaire and to the Overall Survey Plan 3
- B. Revisions to the Mobile Odor Evaluation Laboratory 4

IV. CALIBRATION OF THE MOBILE LABORATORY 10

V. PUBLIC OPINION SURVEY 13

VI. RESULTS 17

- A. Summaries of Odor Response Data and Demographic Characteristics of the Participants, Nominal Odor Intensities 2, 3, 4, 5, and 6 17
- B. Response Data and Characteristics of Participants, Nominal "D-0" Odor Intensity . 26
- C. Effects of Demographic Variables on Odor Responses 29
- D. Additional Data Analysis 30

VII. APPLICATION OF RESULTS IN CONJUNCTION WITH INFORMATION ON ODOR CONTROL TECHNOLOGY 35

LIST OF REFERENCES 38

APPENDIXES

- A. Input from Consultants: National Opinion Research Center; Dr. Amos Turk . . A-1
- B. Directions to Participants B-1
- C. Calibration Data C-1
- D. Field Study Data D-1

LIST OF ILLUSTRATIONS

Figure		Page
1	Curbside View of Mobile Odor Evaluation Laboratory	4
2	Streetside View of Mobile Odor Evaluation Laboratory	4
3	View of Mobile Laboratory from the Right Rear Showing Generator Set/Odor Source in Rear Compartment	7
4	Odor Dilution Control System Used in 1969 Survey	7
5	Odor Dilution Control System Used in 1970 Survey	7
6	System Set Up for Tests with No Diesel Odor	7
7	Interior of Odor Evaluation Room Looking Toward Rear	8
8	Schematic of Mobile Odor Evaluation Laboratory Showing Revised Dilution Air Purification/Humidity Control System	8
9	View of Front Mechanical Compartment, Facing Forward, 1969 Configuration	9
10	View of Front Mechanical Compartment, Facing Rearward, 1969 Configuration	9
11	View into Front Mechanical Compartment from Odor Evaluation Room, 1970 Configuration	9
12	View of Front Mechanical Compartment, Facing Forward, 1970 Configuration (Comparable with Figure 9)	9
13	View of Front Mechanical Compartment, Facing Rearward, 1970 Configuration (Comparable with Figure 10)	9
14	Odor Panel "B," "O," "A," and "P" Quality Ratings as Functions of "D" Intensity Rating	11
15	Map of San Antonio Showing Test Site Locations	13
16	Test Site 01, West Side of Main Plaza	14
17	Test Site 02, Northwest Shopping Center	14
18	Test Site 03, Sears Southside Store	14
19	Test Site 04, McCreless Shopping City	14
20	Test Site 05, Lackland Plaza Shopping Center	14
21	Test Site 06, Spartan-Atlantic Store	14
22	Fraction of Participants Who Chose Each Cartoon, Five Odor Levels	20
23	Average Cartoon-Number Responses for 1969 and 1970 Survey Data	21

LIST OF ILLUSTRATIONS (Cont'd)

Figure		Page
24	Responses to Questions 1, 3, and 4 on Back of Questionnaire	22
25	Responses to First Part of Question 2, Back of Questionnaire	23
26	Responses to Second Part of Question 2, Back of Questionnaire	24
27	Objectionability Results of 1969 and 1970 Surveys	25
28a	Effect of Sex on Odor Responses	31
28b	Effect of Age on Odor Responses	31
28c	Effect of Education on Odor Responses	32
28d	Effect of Income on Odor Responses	32
29	Comparison of Observed and Estimated Cartoon-Numbers	33
30	Comparison of Odor Ratings from a City Bus, 4-Month Fleet Test of Improved (LSN) Injectors	36

LIST OF TABLES

Table		Page
1	Summary of Sniffmobile Calibration Results	10
2	Comparison of Fuels Used in 1969 and 1970 Surveys	11
3	Percent Distributions Based on the U.S. Population	16
4	Summary of Odor Opinion Data–Test Site 05	17
5	Summary of Odor Opinion Data–Test Site 04	18
6	Summary of Odor Opinion Data–Test Site 01	18
7	Summary of Odor Opinion Data–Test Site 02	19
8	Summary of Odor Opinion Data–Test Site 03	19
9	Cartoon-Scale Responses to the Odors Tested	21
10	Responses to Questions on Back of Questionnaire, Except Cartoon Ratings	22
11	Responses to Questions on Objectionability and Odor Reduction	23
12	Summary of Data–Test Site 06	27
13	Effects of Demographic Variables on Odor Responses	29
14	Normalized Responses for Each Category and Level	30
15	Observed and Estimated Average Cartoon Responses	33
16	Comparison of Odor Ratings, 4-Month Fleet Test of Improved (LSN) Injectors	35

I. INTRODUCTION

In order to determine public opinion of various intensities of diesel exhaust odors, the first of two projects was undertaken by the SwRI Vehicle Emissions Research Laboratory in June 1968. The first project ended on February 15, 1970 and made data available on public response to diesel odors presented in a series of three increasing intensities. These data indicated that comparative responses to odors by the general public were quite similar in the five major urban areas surveyed, and they gave good indications of variation in response to odors as functions of variables such as age, income, sex, and education. The areas in which improvement was considered necessary were (1) elimination of the possible "history" or "previous experience" effects on response to odors presented in a series, (2) learning something more specific about odor objectionability, and (3) finding out what would happen if a sample containing no diesel odor were presented to participants in the same way as the odorous samples.

To this end, the project reported herein was initiated on February 16, 1970, to place public opinion of diesel exhaust odors on a more absolute basis. This contract is CPA 70-44, "Public Response to Diesel Engine Exhaust Odors," and the work was performed for the Air Pollution Control Office of the Environmental Protection Agency. This report covers plans and preparations, mobile laboratory calibration, the field survey, and results. The raw data and other materials are given in full in the appendixes.

II. OBJECTIVE

The objective of this project has been to establish the objectionability of several intensities of diesel exhaust odor by presentation of each intensity singly to a quota-sampled group of urban/suburban residents. The plan has been to elicit responses to these odor intensities by means of standardized instructions and a questionnaire employing both a hedonic rating scale (a scale depicting a range of pleasure and displeasure) and direct questions on odor objectionability and odor reduction.

III. PREPARATIONS

The two major divisions of this section describe revisions to the questionnaire and survey plan and revisions to the mobile odor evaluation laboratory. The report on the 1969 five-city survey, titled "A Field Survey to Determine Public Opinion of Diesel Engine Exhaust Odor" and dated February 1970, gives full details on use of the mobile laboratory and questionnaire to elicit public opinion of diesel exhaust odor.(1)*

A. Revisions to the Questionnaire and to the Overall Survey Plan

Information generated by the 1969 survey was very helpful in characterizing public response to diesel exhaust odors, but there were three specific areas in which improvements were deemed necessary. The first area was that of responses to the second and third odors presented during the 1969 survey (always a "D-4" and a "D-6", in that order), and the possibility that these responses may have been influenced in some way by the odor(s) presented previously. The second area of concern was that the odor levels used in the 1969 survey may not have spanned a broad enough range to elicit responses which differ significantly from one another, and the third area was that the respondents had not been able to express whether or not they found the odor objectionable in a direct enough manner.

To resolve questions surrounding the three problem areas outlined above, a meeting was held at SwRI on April 1, 1970. In attendance at this meeting were Jeffrey L. Raney, Jerry C. Romanovsky, Dr. Amos Turk, Karl J. Springer, and Charles T. Hare. Mr. Raney was the Project Officer at that time. Mr. Romanovsky is involved in preparation of air quality criteria and long-range goals of pollution and odor abatement programs, and Dr. Turk is an internationally known odor chemist who was engaged as a consultant. A statement of the primary goals of the 1970 survey was then drawn up as follows:

(1) To substantiate and to quantify information generated in the initial opinion survey, and to expand the number of odor intensities tested, and

(2) To provide information needed to assist in setting air quality criteria involving diesel odors.

It was the consensus of the group at the April 1 meeting that the questionnaire had generally been very successful in the 1969 survey, so it was resolved not to change it any more than was necessary (the revised questionnaire is included as the next page of this report, for reference). In particular, to insure compatibility of 1969 and 1970 data, it was agreed that the cartoon scale and descriptive words used by the participants to "rate" the odors should not be changed. In order to prevent the possibility of a "history" or "previous experience" effect on the 1970 odor responses, it was decided that only one odor sample should be presented to each participant. This decision made it necessary to eliminate reference to multiple odors in the initial statement on the back of the questionnaire and to eliminate the second and third lines of boxes (used for "Test 2" and "Test 3" responses in the 1969 survey) under the cartoons. Question Number 1 on the back of the questionnaire, "Did you smell anything?", was added primarily to anticipate difficulties the participants might have in perceiving the less intense odors. Question Number 2 on the back of the questionnaire is in two parts, the first of which is essentially the same as the "experience" question used in the 1969 survey. The second part of the question is new, and was included because the participant's frame of reference is important when his opinion on odors is being considered. Answers to the second part of Question 2 were also thought to be significant in determining which participants could and could not identify the odor, since it is rarely present indoors. Question Number 3 on the back of the questionnaire was included specifically to determine the participants' opinions in terms of the word "objectionable" since this word is often used in air quality criteria. This question obtains each person's opinion of the odor in relation to his definition of "objectionable," and this method of obtaining objectionability is more direct than the method used previously. Question Number 4 is somewhat related to a question used during the 1969 survey, and was included as an attempt to obtain public opinion in terms of action which the participants felt was desirable to reduce the diesel odors.

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*Superscript numbers in parentheses refer to the List of References at the end of this report.

The front of the questionnaire was revised somewhat to improve its readability, and the number-code answer system was replaced by boxes which could be checked to indicate an affirmative answer. The age question was modified to break the 25 to 44 age group into two smaller parts (25 to 34 and 35 to 44), and the education question was changed to include another category, "Completed 4 yrs College," to make a distinction between those having some college and those having completed college. The family income question was modified to include an additional group in the higher income bracket, and the questions on health and smoking used on the 1969 questionnaire were deleted.

The revised questionnaire was reviewed by Mr. Paul Sheatsley and Dr. Ben King of National Opinion Research Center (NORC). These men and other staff members worked on development of the original questionnaire, as well as the survey and analysis phases of the 1969 project. After NORC's assistance and report was received(2), the questionnaire in its final form was forwarded to the Project Officer on May 11, 1970, and Bureau of the Budget approval was granted on July 15, 1970. Some revisons were also made to the standardized verbal directions given to the participants. In particular, references to multiple odors were eliminated, and instruction was given regarding what to do if no odor was perceived. A copy of the verbal directions is in Appendix B.

The major change in the experimental plan, that of using a single odor intensity for each participant rather than three, necessitated some other changes. During the 1969 survey, over 3,000 participants evaluated the odors presented, but it was realized that a sample of comparable size for each of the odors presented in the 1970 survey would be a practical impossiblity. It was decided that a quota based on 200 persons would probably yield acceptable results, and it was expected that some 300 to 400 persons would be surveyed before all the quotas would be filled. The quotas set and the basis for them are discussed in Section V. Another change anticipated was in calibration of the mobile laboratory, which is discussed in Section IV. It was also obvious that some changes in analysis of data would become necessary, although the exact nature of all these changes was not known initially. The data analysis used and the differences between analysis of 1969 and 1970 data are explained in Results, Section VI. In order to get public response to a wider variety of odor intensities, it was also determined that odors having nominal intensities "D-2", "D-3", "D-4", "D-5", and "D-6" should be tested. As an essentially separate experiment, public response to a sample containing no diesel exhaust was also to be obtained. It was pointed out that some odor would probably be present in the delivery ducts, but it was agreed to do as good a job as possible of purging the ductwork before starting that phase of the survey. This requirement was part of the reason why the humidity control/air cleanup system was necessary.

B. Revisions to the Mobile Odor Evaluation Laboratory

For orientation purposes, Figures 1 through 3 are general exterior views of the mobile laboratory, called the "Sniffmobile," which was used in these studies. Figure 1 is a curbside view of the unit with the ramp in place. In some locations, the tractor was left connected to the laboratory as shown, but, where space was at a premium, it was unhitched and parked elsewhere. Figure 2 is a streetside view of the unit,

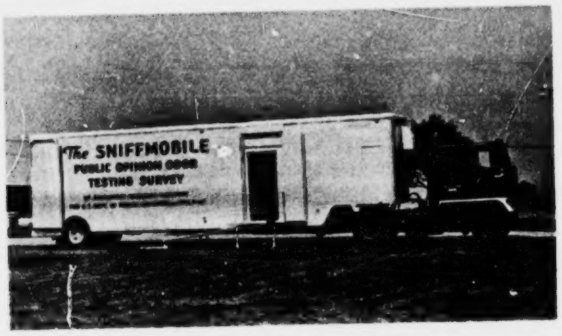


Figure 1. Curbside View of Mobile Odor Evaluation Laboratory

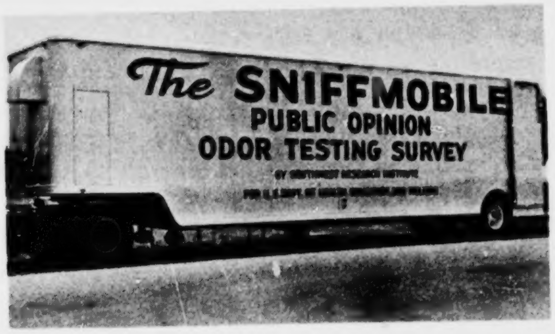


Figure 2. Streetside View of Mobile Odor Evaluation Laboratory

Form Approved
Budget Bureau No. 85-S69017

No. ____________________

PUBLIC OPINION ODOR TESTING SURVEY

IMPORTANT! PLEASE READ.

This survey is to find out your opinion of a common odor typical of U.S. cities. The odor has no known health hazard and your participation is completely voluntary.

DIRECTIONS

FOR EACH QUESTION, CHECK THE BOX BESIDE THE ONE ANSWER WHICH FITS YOU BEST. ALL ANSWERS ARE CONFIDENTIAL. YOU WILL NEVER BE IDENTIFIED.

1. **YOUR SEX:**
   - Male . . . . ☐
   - Female . . . . ☐

2. **YOUR AGE:**
   - 15–24 . . . . ☐
   - 25–34 . . . . ☐
   - 35–44 . . . . ☐
   - 45–64 . . . . ☐
   - 65 or over . . . . ☐

3. **YOUR SCHOOLING:**
   - 8 yrs. or less . . . . ☐
   - Some High School. . . . . . ☐
   - Completed H.S. . . . . . . ☐
   - Some College . . . . ☐
   - Completed 4 yrs. College . . . ☐

4. **YOUR USUAL ACTIVITY:**
   - Employed . . . . ☐
   - Housewife. . . . . ☐
   - Student . . . . ☐
   - Retired . . . . ☐
   - Other . . . . ☐

5. **IF YOU CIRCLED EMPLOYED, WHAT TYPE OF WORK?**
   - Professional, business owner or manager . . . . ☐
   - Clerical, office or sales . . . . ☐
   - Skilled or semi-skilled wage earner . . . . ☐
   - Other . . . . ☐

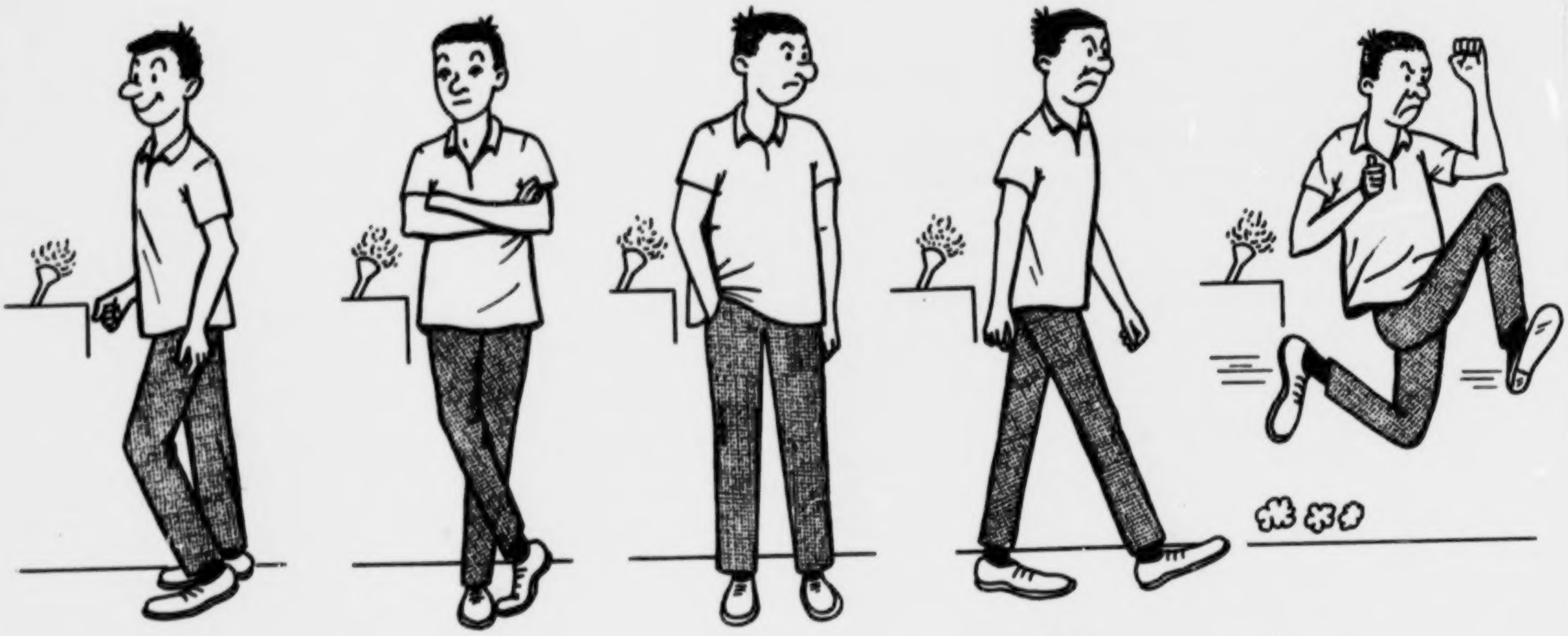
6. **FAMILY INCOME LAST YEAR:**
   - Under $4,000 . . . . ☐
   - 4,000–6,999 . . . . ☐
   - 7,000–9,999 . . . . ☐
   - 10,000–14,999 . . . . . . ☐
   - 15,000 or more. . . . . . . ☐

NAPCA Form No.
HQ 27 (4/69)

Next, an odor will be presented.

1. Did you smell anything? Yes ☐ No ☐

IF YES, CHECK THE BOX UNDER THE FIGURE WHICH BEST EXPRESSES YOUR FEELING, THEN ANSWER QUESTIONS 2, 3, AND 4.



Pleasant	**Neutral**	**Unpleasant**	**Very Unpleasant**	**Unbearable**
☐	☐	☐	☐	☐

2. **How often have you experienced this odor?**

Very Often . . . . ☐

Fairly Often . . . . ☐

Occasionally. . . . . ☐

Never . . . . ☐

If you have experienced the odor, where?

Indoors . . . . ☐

Outdoors . . . . ☐

Both Indoors and Outdoors . ☐

3. **If you were to experience an odor just like this outdoors, would you find it objectionable?**

Yes . . . . ☐

No . . . . ☐

4. **If an odor just like this occurred outdoors, should someone take steps to reduce it?**

Yes . . . . ☐

No . . . . ☐

and Figure 3 is a view from the right rear showing the odor source/generator set mounted on vibration isolators, the engine's exhaust system, the fuel tank, and some of the odor presentation and fume removal ductwork. Figure 4 is a detailed view of the dilution control system used for the 1969 survey, showing the exhaust pipe at left, the dilution air duct at right, the exhaust line running between the exhaust pipe and the dilution air duct, the bypass, and the pneumatic cylinders and bellcranks which were attached to the exhaust and bypass dampers. Figure 5 shows the same view as Figure 4, except for revisions made for the 1970 survey. The "stops" underneath the pneumatic cylinders can be set to limit damper travel at any point desired, and this point was different for each odor level. Figure 6 shows the same area again, but this time as set up for running the final test with no diesel odor present. Note that the bypass line has been removed and that a solid plate has been inserted between the halves of the flange nearest the dilution air duct to block the exhaust flow.

The interior space of the Sniffmobile was unchanged for 1970, as shown in Figure 7. Other views of the interior are given in the report on the 1969 survey, and the reader should refer to them for more detail. The remaining major modifications concerned treatment of the dilution air supply in an effort to control its humidity and more effectively remove ambient odors. Figure 8 is a schematic of the revised system, showing the spray chamber and heat exchanger which have been added. In the original Sniffmobile design, approximately 250 CFM of air, filtered by particulate and charcoal filters, was piped from the front mechanical compartment to the rear engine compartment where a relatively small amount of exhaust was added. The amount of exhaust added depended on the desired odor level, and this same general setup was

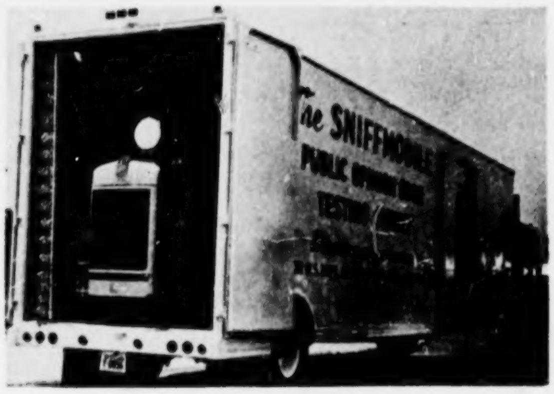


Figure 3. View of Mobile Laboratory from the Right Rear Showing Generator Set/Odor Source in Rear Compartment

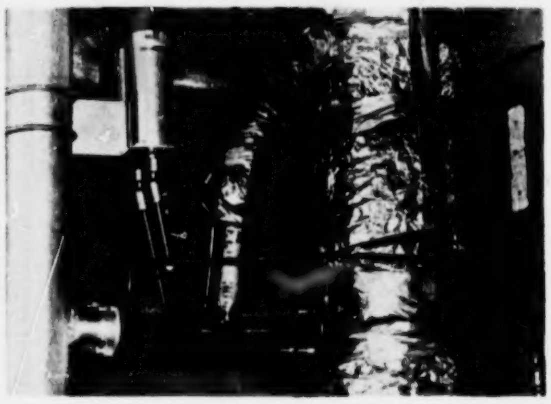


Figure 4. Odor Dilution Control System Used in 1969 Survey

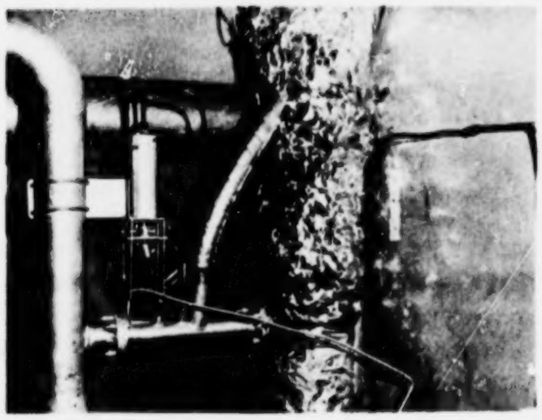


Figure 5. Odor Dilution Control System Used in 1970 Survey

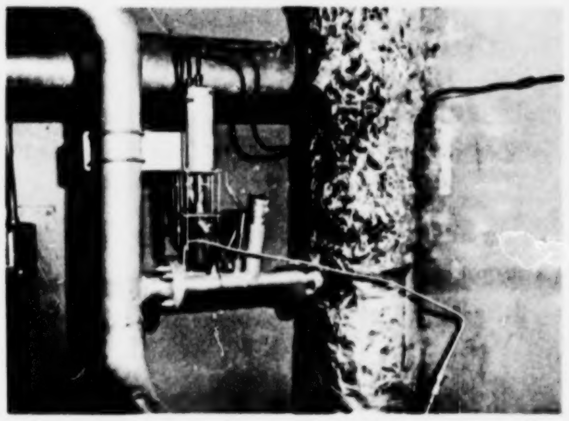


Figure 6. System Set Up for Tests with No Diesel Odor

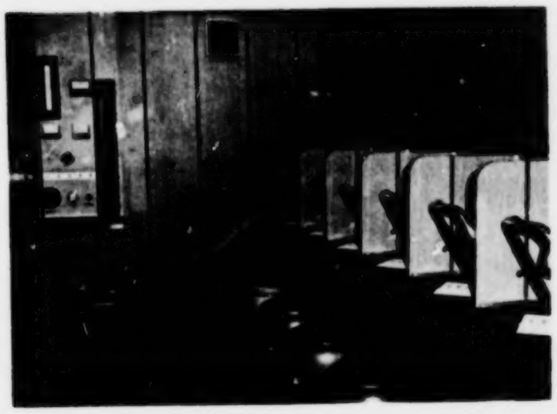


Figure 7. Interior of Odor Evaluation Room Looking Toward Rear

used for the 1970 survey with better dilution air cleanup. The design requirement was to supply diluent air as odor-free as practical at a constant temperature of 75°F and at a constant absolute humidity of 64 grains water per pound dry air (50% relative humidity). Other considerations were that the system would have to be compatible with the Sniffmobile weight, and space and power requirements. The system selected is very similar to the one which has proved satisfactory in the stationary SwRI odor evaluation laboratory. This system uses an air "washing" method in which the diluent air, after having passed through charcoal and particulate filters, goes through a chamber into which water is sprayed. The water is circulated through a heat exchanger which maintains a water temperature of 53°F, and, at the exit of the spray chamber, the air is saturated at a temperature of about 55°F. The air passes through another charcoal filter, then through an insulated duct to the rear of the Sniffmobile. At this point, a small amount of electrical reheat is applied so that, after the diesel exhaust is added, the mixture temperature is 75°F.

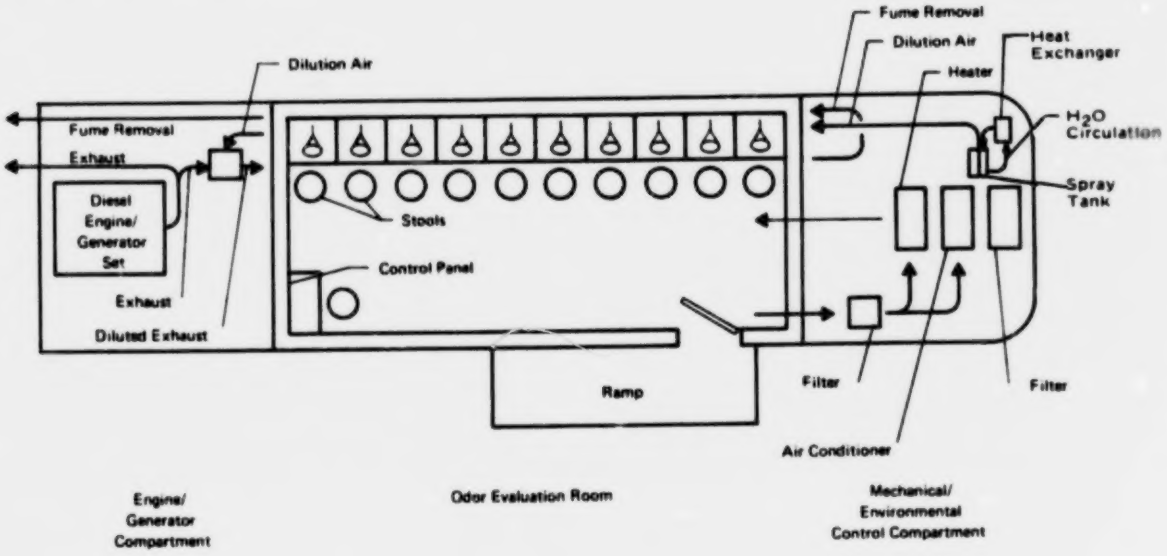


Figure 8. Schematic of Mobile Odor Evaluation Laboratory Showing Revised Dilution Air Purification/Humidity Control System

The new items of hardware include the spray chamber, an additional refrigeration unit to cool the spray water, the heat exchanger where the cooling takes place, a water makeup system for the spray chamber, and additional insulation on the duct which carries the dilution air from the front of the Sniffmobile to the rear. Addition of the refrigeration unit and recirculating pump created a substantial increase in electrical load on the generator, which in turn created a requirement for additional power from the engine/odor source. Since the engine operated at a different power setting for the 1969 and 1970 surveys, the control/odor intensity relationship changed to some extent. Figure 9 (both Figures 9 and 10 were taken before modifications were made) is a view into the front mechanical compartment from the door, facing forward. At the top of the picture is the main air inlet duct, and the condensation overflow tank for the main air-conditioning system is at the lower right. Figure 10 shows the main air-conditioning blower and odor room air ducts facing from the front of the mechanical compartment back toward the odor presentation room. The dilution air duct can be seen below the odor room air duct, and the interior of the odor presentaton room can just be seen through the door at left. Figures 11 through 13 were taken after the modifications for the 1970 survey were complete. Figure 11 shows a portion of the mechanical compartment through the door from the odor evaluation room.

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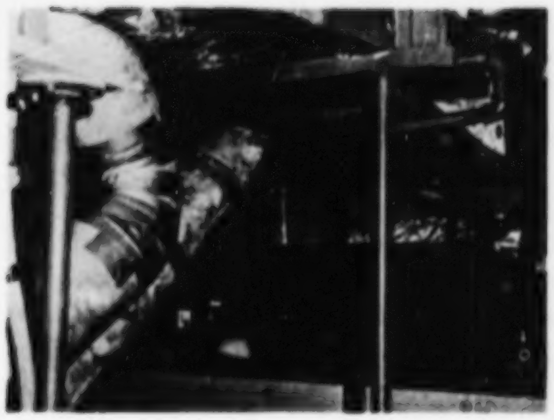

Figure 9. View of Front Mechanical Compartment, Facing Forward, 1969 Configuration

Figure 10. View of Front Mechanical Compartment, Facing Rearward, 1969 Configuration

Figure 11. View Into Front Mechanical Compartment from Odor Evaluation Room, 1970 Configuration

Figure 12. View of Front Mechanical Compartment, Facing Forward, 1970 Configuration (Comparable with Figure 9)

Figure 13. View of Front Mechanical Compartment, Facing Rearward, 1970 Configuration (Comparable with Figure 10)

The heat exchanger for the spray water is on the floor at right and the spray chamber is forward over the refrigeration units. Figure 12 was taken from the same spot as Figure 9, and shows the additional refrigeration unit at the bottom left (at the front of the compartment). Figure 13 was taken from the same place as Figure 10, and shows the new insulation covering the duct which carries dilution air back to the point where it is mixed with exhaust.

Taken together, these modifications did achieve the set goals. The odor samples were presented at constant temperature and humidity. The additional odor removal provided by the spray chamber allowed operation at a very low odor level when the exhaust and dilution systems were disconnected for the final test (Site 06).

IV. CALIBRATION OF THE MOBILE LABORATORY

Calibration of the Sniffmobile for the 1970 survey was similar to calibration for the 1969 survey, except that the aim was to achieve one fixed odor intensity level for each test site rather than three. The exhaust and bypass dampers were mechanically fixed in position during on-site operations of the 1970 survey, which fixed the exhaust-to-dilution air ratio and the odor intensity at a constant level. The nominal diesel composite intensities which were the goals of the calibration processes were "D-2", "D-3", "D-4", "D-5", and "D-6", and it was also desired to disconnect the exhaust line entirely prior to the survey at the last test site in order to get responses to air alone. In chronological order, the nominal odor "D" intensities sought were 4, 5, 6, 3, 2, and, finally, the sample containing no diesel exhaust.

As was the case with the 1969 calibration and with other work involving the trained SwRI odor panel, multiple runs were made and intensities were presented in random order. In most cases, 10 panelists were present, but occasionally there were 9 or 11. In averaging of the intensity and quality ratings, the number of persons on the panel for any given run determined the weight given that run, or, in other words, the value of any one panelist's rating was always the same.

Table 1 is a summary of the calibraton results, and the pertinent raw data are given in Appendix C. Figure 14 shows these data graphically with the "B", "O", "A", and "P" ratings as functions of the "D" rating. This graph is similar to Figure 24 of the report on the 1969 survey, even though the independent variables differ, since the "D" rating and the "signal pressure" last year were almost directly proportional to one another. Another probable reason that the qualities bore approximately the same relationships to intensity during the 1970 calibration as they did during the 1969 calibration is that the fuels used for calibration and on-site testing were very similar. Table 2 lists specifications for fuels used in both surveys, and these specifications are nearly identical.

It may be of interest to explain why the nominal and actual odor intensities differ in some cases, and, in doing so, it is necessary to consider a typical day of calibration by the SwRI odor panel. Assume that it is the first working day following Sniffmobile operaton at a test site, and that the first requirement is to confirm the odor intensity used at the previous site. The mechanical arrangement by which the dilution (and therefore the odor intensity) is fixed permits the presentation of samples up to and including the fixed intensity, but not exceeding it. For instance, if the previous odor level used had been a nominal "D-4", the system would permit anything up to a "D-4", but nothing above. The odor panel is presented a randomly ordered set of samples having intensities up to and including the one previously used (to avoid removing the "stops" which limited the odor intensity), and the runs at the fixed maximum intensity are averaged for calibration purposes. Once the odor level has been confirmed, the "stops" are removed and the remainder of the day is used for panel practice and to get some idea how the controls should be set to obtain the next intensity desired.

Table 1. Summary of Sniffmobile Calibration Results

Nominal "D" Level (Goal)	Test Site	Dates of Calibration	Dates of Test Site Operation	Calibrated Odor Intensity and Qualities				
				D	B	O	A	P
2	5	11/3 and 11/6	11/4 to 11/6	2.00	0.96	0.66	0.34	0.05
3	4	10/27 and 11/2	10/28 to 10/30	3.16	1.00	0.94	0.81	0.38
4	1	9/22 and 9/30	9/23 to 9/25	3.82	1.11	1.02	0.94	0.74
5	2	10/6 and 10/15	10/7 to 10/9	4.90	1.63	1.22	0.98	1.00
6	3	10/20 and 10/26	10/21 to 10/23	5.82	1.90	1.43	1.13	1.06
0	6	11/10 and 11/16	11/11 to 11/13	0.38	0.18	0.09	0.08	0.00

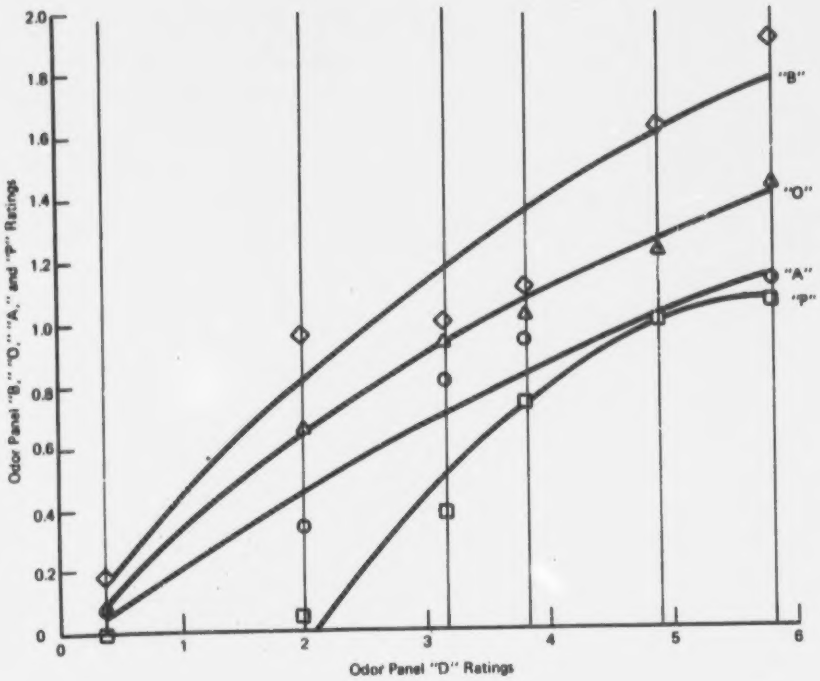

Figure 14. Odor Panel "B," "O," "A," and "P" Quality Ratings as Functions of "D" Intensity Ratings

The morning of the second calibration day is used for an additional series of runs over the whole range of the system and the results are normally graphed. From this graph, the control setting required to obtain the next odor intensity desired is estimated, and the "stops" on the control system are set accordingly. In order to get a relatively large number of calibration runs at the "set point," the stops cannot be moved again, which causes the discrepancies between nominal and actual odor levels. For the purposes of this study, it was not necessary to survey at *exactly* the nominal odor levels, so the calibration procedure described was considered sufficient.

The one exception to the calibration procedure described was the nominal "zero" odor. In order to get the odor level as low as possible, the exhaust line between the exhaust system and the dilution system was removed and the resulting holes were capped. The odor presentation system was purged for several days, during which time the water in the humidity control subsystem was changed frequently (this subsystem also worked as a "scrubber" to remove odors from the dilution air). The odor panel was brought in following the purge period and it evaluated the "odor" several times. It was impossible at this point, of course, to present anything except the nominal "zero" odor, since the exhaust line had been disconnected. This procedure was repeated immediately

Table 2. Comparison of Fuels Used in 1969 and 1970 Surveys

	1969 Survey EM-70-F	1970 Survey EM-165-F
Distillation Range, °F		
Initial boiling point	338	321
10% point	364	360
20% point	372	370
30% point	380	380
40% point	387	389
50% point	395	397
60% point	404	407
70% point	412	419
80% point	427	433
90% point	449	455
End point	521	499
Percent recovery	99.5	99.0
Percent residue	0.5	1.0
Percent distillation loss	0.0	0.0
Cetane Number	47.0	–
F.I.A. Analysis		
percent aromatics	15.0	14.9
percent olefins	0.0	3.8
percent saturates	85.0	81.3
Total Sulfur, percent	0.05	0.09
Gravity, °API at 60°F	44.6	44.2

following the "no odor" survey to make certain nothing had contaminated the system. The consensus of the odor panel was that a slight "dusty" residual odor remained after the purge period, and this opinion is reflected by the average odor panel rating of "D-0.38" for this condition. The panel was instructed to rate the nominal "zero" odor against the standards of the PHS Q/I kit, but the rating of this odor probably means little because the comparison breaks down when the odor does not contain characteristics similar to those in the kit. The "D-0.38" rating should be construed only as the intensity of the residual odor, and the corresponding "B", "O", "A", and "P" ratings were an unsuccessful attempt to characterize the odor.

V. PUBLIC OPINION SURVEY

The 1970 survey of public opinion on diesel engine exhaust odors was carried out in San Antonio at six locations. Only one odor was presented to participants at a test site, and the participants were observed carefully by the survey crew to make sure none of them took part in the survey twice at the same site. In addition, the sites were far enough apart to make it unlikely that the same person ever participated in the survey more than once, even if the crew forgot some of the participants' faces. This changing of test sites was done to minimize the risk of a "history" or "previous experience" effect on the response of any participant. Figure 15 is a map of San Antonio showing test site locations, and it can be used for reference as the sites are described.

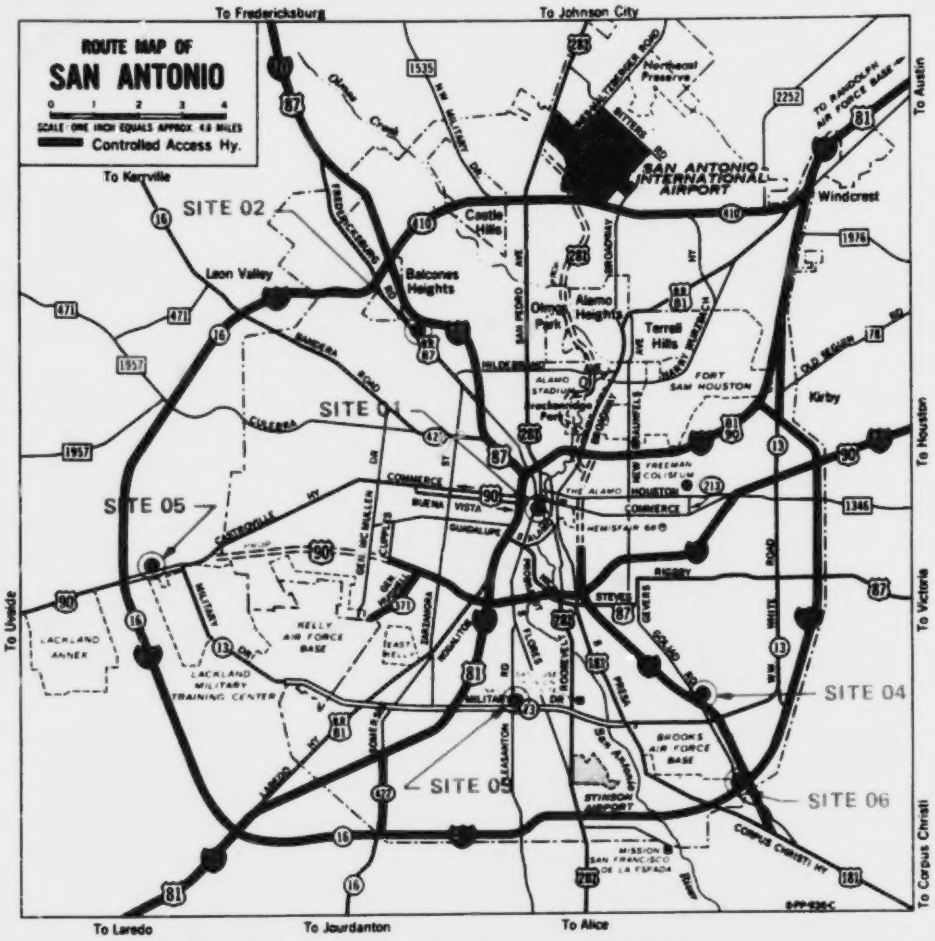

Figure 15. Map of San Antonio Showing Test Site Locations

Test site 01 was Main Plaza in downtown San Antonio, approximately in the center of the map. This site was also used during the 1969 survey. It is a public square with good pedestrian traffic and a population mixed in practically every regard. The location of the Sniffmobile was along the curb on the west side of the square, and Figure 16 shows the location during operation. The days during which operations were conducted at Main Plaza were September 23, 24, and 25, 1970.

At Main Plaza, as well as the other test sites, at least one member of the survey crew was bilingual in English and Spanish. This procedure was followed because a sizeable fraction of the San Antonio population speaks Spanish, and the crew needed an interpreter to conduct the survey with Spanish-speaking people.

Test site 02 was Northwest Center, which is one of the oldest shopping centers on the north side of San Antonio. On the map, this site is between Interstate 10 and Fredericksburg Road (Business Route 87)

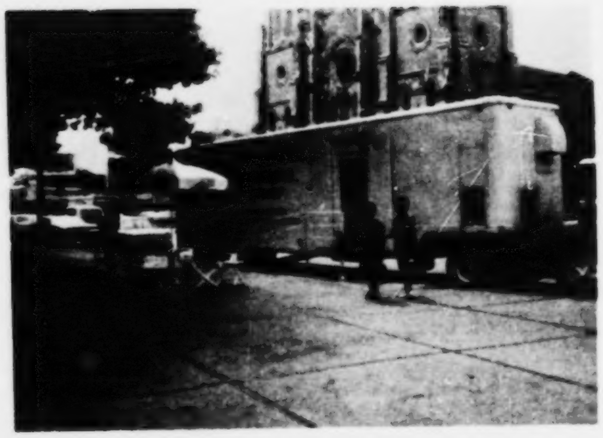

Figure 16. Test Site 01, West Side of Main Plaza

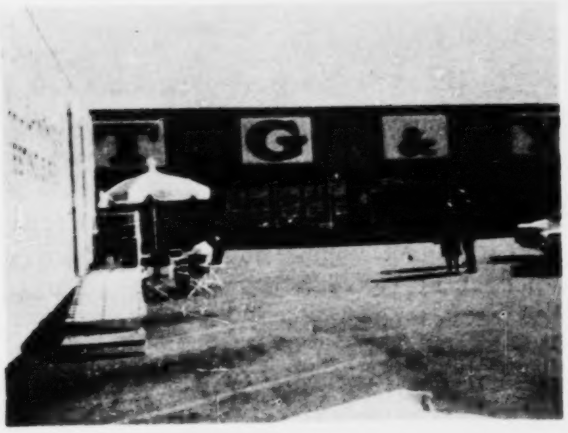

Figure 17. Test Site 02, Northwest Shopping Center

Figure 18. Test Site 03, Sears Southside Store

Figure 19. Test Site 04, McCreless Shopping City

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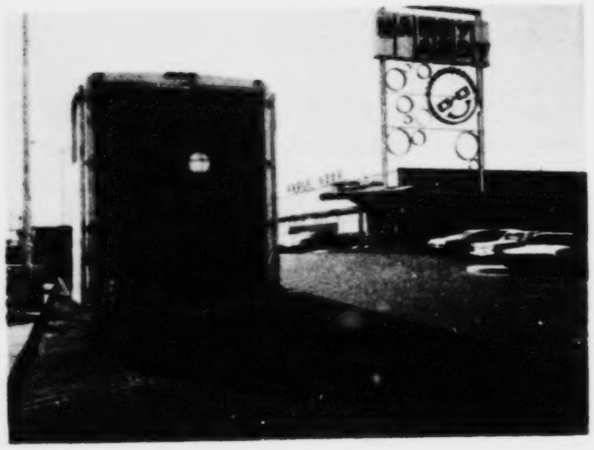

Figure 20. Test Site 05, Lackland Plaza Shopping Center

Figure 21. Test Site 06, Spartan-Atlantic Store

about five miles northwest of the downtown area. The area around this test site is commercial and residential, and most of the people who live nearby are in the middle economic brackets. Over 50 percent of the local residents are Caucasian. The site was in front of a TG&Y (five and dime) store, and near a sidewalk which fronted along several other stores. The dates of operation at site 02 were October 7, 8, and 9, 1970, and Figure 17 shows the general appearance of the site and surrounding area.

The Sears, Roebuck & Co. Southside Store provided the location for test site 03. This location is directly south of the downtown area, as shown in Figure 15, at the intersection of Military Drive and Pleasanton Road. The surrounding area is predominantly commercial, and the nearby residents are mostly in the middle socio-ecomonic groups. Somewhat less than 50 percent of the local people here are Caucasian, with the majority being Mexican-American. October 21, 22, and 23 were the dates of operation at site 03, and a view of the location is given in Figure 18.

The fourth test site location was near a large Handy-Andy food store in McCreless Shopping City, a large shopping center on the city's southeast side. This location is near the intersection of Goliad Road and Southeast Military Drive (Loop 13), and the participants at this location were mostly in the middle socio-economic classes and well mixed as to ethnic groups. The surrounding area is mostly lower middle class residential. Days of operation at site 04 were October 28, 29, and 30, 1970, and the appearance of the location is shown in Figure 19.

Lackland Plaza shopping center was the location of test site 05, on the west side of San Antonio near Lackland Air Force Base. This shopping center is rather small, but adequate pedestrian traffic was found by locating near a food store. The surrounding area is commercial and residential, and the local population is mostly in the middle socio-economic group and mostly Caucasian. Operations were conducted at this location on November 4, 5, and 6, and the site is shown in Figure 20.

The final test site was a Spartan-Atlantic (discount department) store near the intersection of Loop 410 and Goliad Road. Site 06 is located in an area dominated by Brooks Air Force Base, and the area is primarily commercial. Less than half the nearby residents are Caucasian in this area, and the people are predominantly in the middle socio-economic classes. The dates of operation at this site were November 11, 12, and 13, and the location is shown in Figure 21.

As a general rule, data were tabulated immediately following a group's participation in the survey, but, sometimes, there was not sufficient time to tabulate the data as they were collected. Data from the day's work, however, were tabulated in time to provide a guideline for the following day's sampling. The population data on which sampling quotas were based were supplied by Mrs. Carol Richards of NORC.(3) The income data supplied were from the 1967 *Current Population Survey*, and the other data were from the 1968 version of the same source. Table 3 lists the data from which quotas were composed and the quotas of people needed based on a "perfect" sample of 200 persons. All these data refer to the segment of the population which is over 14 years of age, and the complete set of data sent by NORC is given in Appendix A. Each of the quotas is independent of the others; e.g., if a certain person was between 35 and 44 years of age, he counted as part of the quota for the 35 to 44 age group no matter what other categories he occupied.

Most of the quotas were filled at all the test sites, but the ones hardest to fill were the same as in the 1969 survey, namely 0 to 8 years of education and age 65 and above. The case must be that undereducated people are simply less likely to participate in the survey than well-educated people are, and that the same thing holds true for older people. It is also probable, of course, that a smaller percentage of older people (65 and above) are to be found in shopping centers and plazas than other age groups.

A copy of the standarized instructions which were given verbally to the participants is included as Appendix B. This set of instructions was revised somewhat from the 1969 version to reflect the change from multiple to single odor presentation and to give special instructions to those participants who did not perceive the odor presented.

Table 3. Percent Distributions Based on the U.S. Population

Category	Percent of U.S. Population	Quota, Based on Sample of 200
Sex: Male	48.5	97
Female	51.5	103
Age: 15-24 yr	25.1	50
25-34 yr	16.4	33
35-44 yr	16.6	33
45-64 yr	28.5	57
65 yr or more	13.3	26
Education: 0-8 yr	27.9	56
Some high school	22.1	44
Completed high school	30.7	61
Some college	10.6	21
Completed 4 yr college	8.7	17
Income: under $4,000	18.8	38
$4,000-$6,999	22.6	45
$7,000-$9,999	24.3	49
$10,000-$14,999	22.4	45
$15,000 or more	12.0	24

VI. RESULTS

The results of this survey supplement those of the 1969 five-city survey in several ways, but the 1970 results are more complex due to the inclusion of additional odor intensities. Where possible, direct comparisons between 1969 and 1970 data will be made, but the report on the 1969 survey should be available for reference purposes.

A. Summaries of Odor Response Data and Demographic Characteristics of the Participants, Nominal Odor Intensities 2, 3, 4, 5, and 6

Tables 4 through 8 are site-by-site summaries of answers given on the questionnaires, and the tables are numbered in order of increasing intensity of the odor presented. Several corrections have been made in these data which reflect the greater accuracy of the computer analysis as compared to the rough data calculated on-site. The five tables represent the primary reduction of data from the raw form given in Appendix D.

The cartoon-scale responses to the odors tested are given in a more concise form in Table 9. The number of participants who chose each cartoon at each test site is on the left side, while the fraction of participants who chose each cartoon and the average cartoon number chosen are on the right side.

Figure 22 shows the fraction of participants who chose each cartoon for each odor intensity tested. These curves are similar to those in Figure 62 of the report on the 1969 study, and show a progression to the right (toward higher cartoon numbers) of the means of the distributions as the odor intensity increases. For example, the mean numerical rating of the "D-2" odor intensity was 2.63, and that for the nominal "D-6" intensity was 3.70, considerably further to the right. Curves of this nature are usually called "relative

Table 4. Summary of Odor Opinion Data–Test Site 05

Nominal "D" level of odor presented	2		
Actual "D" level of odor presented	2.00		
Number of participants	414	Did you smell anything?	
		Yes	367
Sex:		No	47
Male	197		
Female	217		
		Cartoon response:	
Age:		Pleasant (1)	25
15-24	117	Neutral (2)	135
25-34	109	Unpleasant (3)	168
35-44	96	Very unpleasant (4)	30
45-64	75	Unbearable (5)	9
65 and over	17		
Education:		How often have you experienced this odor?	
0-8 yr	30		
Some high school	89	Very often	103
Completed high school	130	Fairly often	127
Some college	119	Occasionally	118
Completed 4 yr college	46	Never	19
Activity:			
Employed	191	If you have experienced the odor, where?	
Housewife	129		
Student	54	Indoors	27
Retired	29	Outdoors	258
Other	11	Both indoors and outdoors	63
Employment:			
Professional	55	If you were to experience an odor just like this outdoors, would you find it objectionable?	
Clerical	40		
Skilled	55		
Other	41	Yes	242
		No	125
Income:			
Under $4,000	65		
$ 4,000-$6,999	123	If an odor just like this occurred outdoors, should someone take steps to reduce it?	
$ 7,000-$9,999	100		
$10,000-$14,999	97	Yes	288
$15,000 or more	29	No	79

Table 5. Summary of Odor Opinion Data–Test Site 04

Nominal "D" level of odor presented	3		
Actual "D" level of odor presented	3.16		
Number of participants	308	Did you smell anything?	
		Yes	299
Sex:		No	9
Male	148		
Female	160		
		Cartoon response:	
Age:		Pleasant (1)	14
15-24	72	Neutral (2)	67
25-34	54	Unpleasant (3)	167
35-44	41	Very unpleasant (4)	47
45-64	87	Unbearable (5)	4
65 and over	54		
Education:		How often have you experienced this odor?	
0-8 yr	44		
Some high school	67	Very often	112
Completed high school	91	Fairly often	82
Some college	86	Occasionally	92
Completed 4 yr college	20	Never	13
Activity:			
Employed	126	If you have experienced the odor, where?	
Housewife	104		
Student	29	Indoors	18
Retired	44	Outdoors	222
Other	5	Both indoors and outdoors	46
Employment:			
Professional	30	If you were to experience an odor just like this outdoors, would you find it objectionable?	
Clerical	32		
Skilled	46		
Other	19	Yes	237
Income:		No	62
Under $4,000	72		
$ 4,000-$6,999	71	If an odor just like this occurred outdoors, should someone take steps to reduce it?	
$ 7,000-$9,999	79		
$10,000-$14,999	57	Yes	256
$15,000 or more	29	No	43

Table 6. Summary of Odor Opinion Data–Test Site 01

Nominal "D" level of odor presented	4		
Actual "D" level of odor presented	3.82		
Number of participants	324	Did you smell anything?	
		Yes	317
Sex:		No	7
Male	184		
Female	140		
		Cartoon response:	
Age:		Pleasant (1)	12
15-24	101	Neutral (2)	58
25-34	78	Unpleasant (3)	160
35-44	55	Very unpleasant (4)	68
45-64	63	Unbearable (5)	19
65 and over	27		
Education:		How often have you experienced this odor?	
0-8 yr	56		
Some high school	63	Very often	148
Completed high school	67	Fairly often	81
Some college	73	Occasionally	66
Completed 4 yr college	65	Never	22
Activity:			
Employed	228	If you have experienced the odor, where?	
Housewife	24		
Student	20	Indoors	23
Retired	28	Outdoors	242
Other	24	Both indoors and outdoors	38
Employment:			
Professional	72	If you were to experience an odor just like this outdoors, would you find it objectionable?	
Clerical	87		
Skilled	51		
Other	18	Yes	262
Income:		No	55
Under $4,000	101		
$ 4,000-$6,999	88	If an odor just like this occurred outdoors, should someone take steps to reduce it?	
$ 7,000-$9,999	53		
$10,000-$14,999	51	Yes	288
$15,000 or more	31	No	29

Table 7. Summary of Odor Opinion Data--Test Site 02

Nominal "D" level of odor presented	5		
Actual "D" level of odor presented	4.90		
Number of participants	288	Did you smell anything?	
		Yes	287
Sex:		No	1
Male	115		
Female	173		
		Cartoon response:	
Age:		Pleasant (1)	5
15-24	60	Neutral (2)	31
25-34	77	Unpleasant (3)	134
35-44	36	Very unpleasant (4)	88
45-64	80	Unbearable (5)	29
65 and over	35		
Education:		How often have you experienced this odor?	
0-8 yr	34		
Some high school	53	Very often	121
Completed high school	65	Fairly often	89
Some college	92	Occasionally	65
Completed 4 yr college	44	Never	12
Activity:			
Employed	129	If you have experienced the odor, where?	
Housewife	107		
Student	17	Indoors	12
Retired	27	Outdoors	226
Other	8	Both indoors and outdoors	37
Employment:			
Professional	51	If you were to experience an odor just like this outdoors, would you find it objectionable?	
Clerical	41		
Skilled	28		
Other	9	Yes	261
		No	26
Income:			
Under $4,000	64		
$ 4,000-$6,999	62	If an odor just like this occurred outdoors, should someone take steps to reduce it?	
$ 7,000-$9,999	75		
$10,000-$14,999	57	Yes	270
$15,000 or more	30	No	17

Table 8. Summary of Odor Opinion Data–Test Site 03

Nominal "D" level of odor presented	6		
Actual "D" level of odor presented	5.82		
Number of participants	356	Did you smell anything?	
		Yes	353
Sex:		No	3
Male	135		
Female	221		
		Cartoon response:	
Age:		Pleasant (1)	3
15-24	81	Neutral (2)	23
25-34	82	Unpleasant (3)	136
35-44	73	Very unpleasant (4)	108
45-64	82	Unbearable (5)	83
65 and over	38		
Education:		How often have you experienced this odor?	
0-8 yr	50		
Some high school	64	Very often	156
Completed high school	112	Fairly often	109
Some college	94	Occasionally	83
Completed 4 yr college	36	Never	5
Activity:			
Employed	153	If you have experienced the odor, where?	
Housewife	139		
Student	25	Indoors	14
Retired	31	Outdoors	293
Other	8	Both indoors and outdoors	41
Employment:			
Professional	55	If you were to experience an odor just like this outdoors, would you find it objectionable?	
Clerical	40		
Skilled	41		
Other	17	Yes	316
		No	37
Income:			
Under $4,000	69		
$ 4,000-$6,999	101	If an odor just like this occurred outdoors, should someone take steps to reduce it?	
$ 7,000-$9,999	92		
$10,000-$14,999	63	Yes	330
$15,000 or more	31	No	23

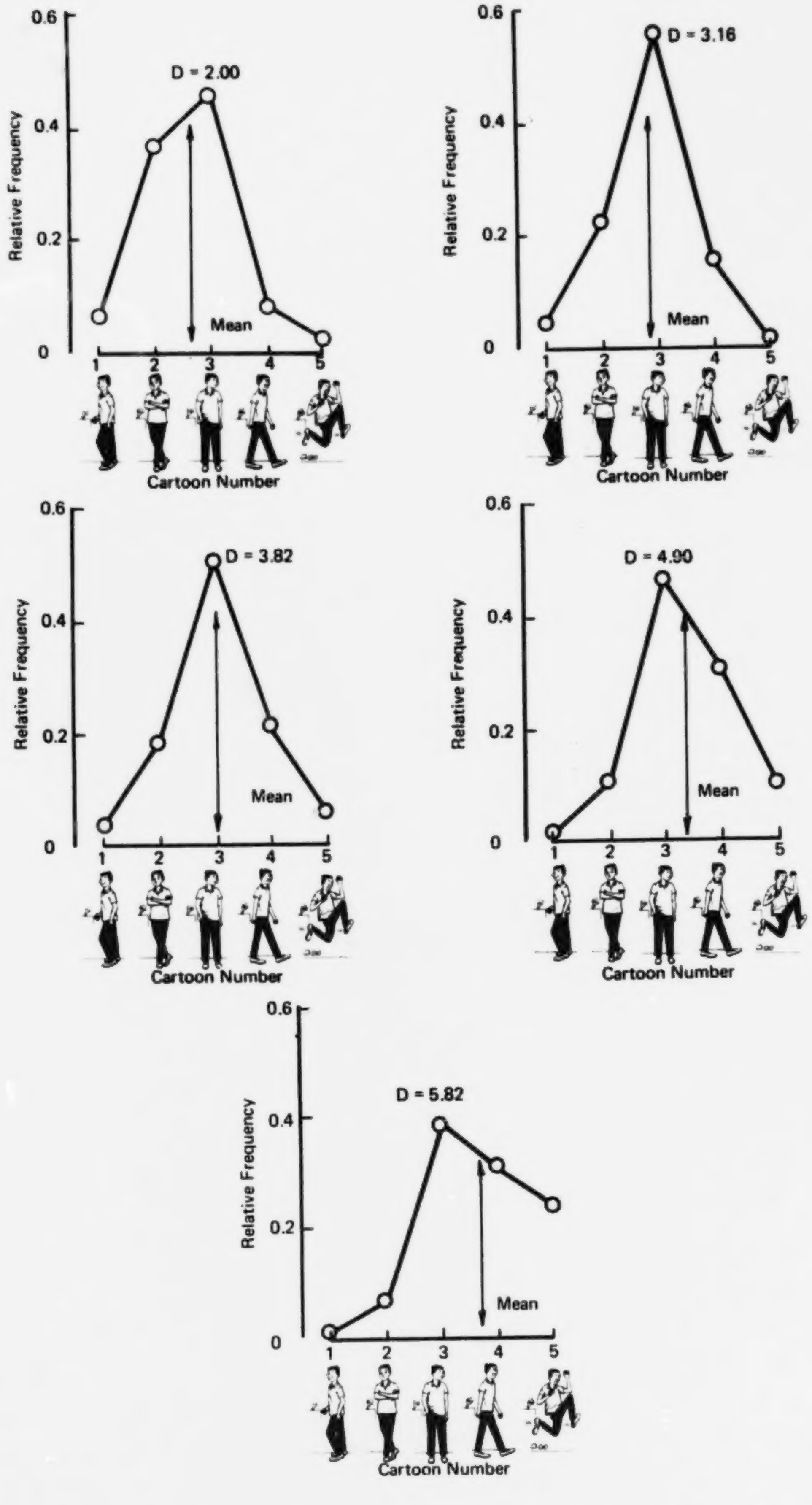

Figure 22. Fraction of Participants Who Chose Each Cartoon, Five Odor Levels

Table 9. Cartoon-Scale Responses to the Odors Tested

Nominal Odor Intensity	Test Site	Sample Size	Number Who Chose Cartoon No.					Fraction Who Chose Cartoon No.					Average Cartoon Number Chosen
			1	2	3	4	5	1	2	3	4	5	
2	5	414	25	135	168	30	9	0.068	0.368	0.458	0.082	0.024	2.63
3	4	308	14	67	167	47	4	0.047	0.224	0.558	0.157	0.013	2.87
4	1	324	12	58	160	68	19	0.038	0.183	0.505	0.214	0.060	3.08
5	2	288	5	31	134	88	29	0.017	0.108	0.467	0.307	0.101	3.37
6	3	356	3	23	136	108	83	0.008	0.065	0.385	0.306	0.235	3.70

frequency polygons" or "discrete relative frequency distributions." Figure 23 gives a comparison between the 1969 survey data and the 1970 survey data as well as a graphic look at the variation of the mean cartoon number chosen as a function of the odor intensity. The 1970 cartoon response data show a greater dislike for the weak diesel odors than was the case with the previous study, but this trend is reversed at the higher odor intensities. The major causes of the lack of agreement are likely to be associated with the change from the "three-odor" to the "one-odor" experimental plan, although a greater public awareness of environmental problems during the 1970 survey may have had some effect at the lower odor levels. (This effect, if it did exist, would have been more noticeable at the lower odor intensities because the "signal" was weaker there.) The San Antonio participants in the 1970 survey showed a greater concern about environmental problems than the San Antonio participants of 1969, and their attitude was reminiscent of the Los Angeles participants of 1969. The participants in the 1969 survey, knowing that there were two odor samples yet to come, may have adopted a somewhat noncommittal "wait and see" attitude about the first odor, which would have moved the average response toward "neutral." The 1970 participants, however, knew they had only one chance to evaluate an odor and this knowledge may have affected their opinions, but neither the direction nor the extent of this possible effect is known.

Table 10 is a summary of answers given on the back of the questionnaire except the above-described cartoon scale ratings. The fractions of the participants who perceived the odors (curve A), wanted them reduced (curve B), and found them objectionable (curve C) are plotted as functions of odor intensity in Figure 24. The ordinates plotted are all quite high, unexpectedly so in most cases, but current theories of odor detection and evaluation make these results more plausible.(4) Reference 4 is Dr. Turk's comments on this project's Quarterly Progress Report No. 3, and is included as part of Appendix A. Referring now to curve A, it should be noted that about 89 percent of the participants indicated that they perceived an odor when the least intense odor was presented. In the light of odor detection being a problem of "signal-to-noise ratio," as Dr. Turk proposes in his remarks(4), it is quite possible that the number of participants who perceived the mild diesel odor plus those who scored a "false alarm" could combine to make up 89 percent of the total. This same argument applies as well to the groups of people who sampled the higher odor

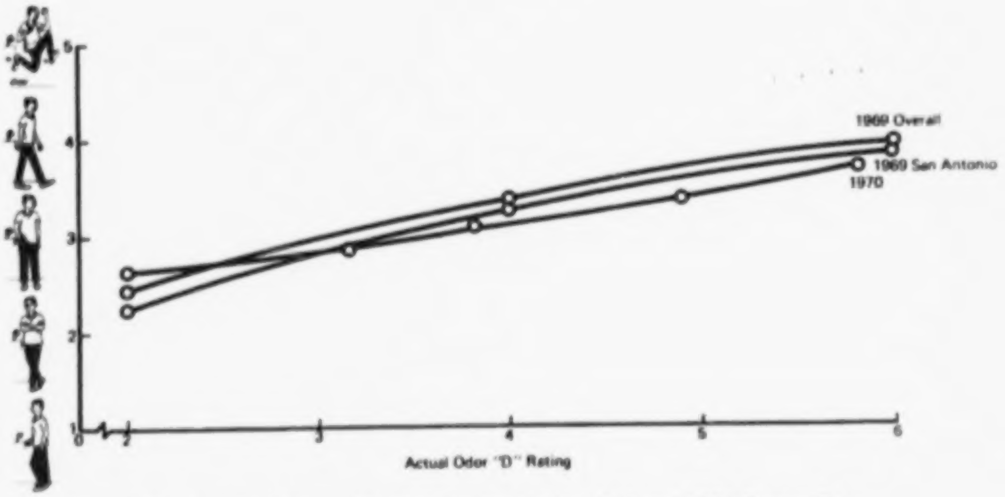

Figure 23. Average Cartoon-Number Responses for 1969 and 1970 Survey Data

Table 10. Responses to Questions on Back of Questionnaire, Except Cartoon Ratings

	Nominal Odor Intensity				
	2	3	4	5	6
Fraction of total sample which:					
Perceived an odor ("yes" to Question 1)	0.886	0.971	0.978	0.996	0.992
Found odor objectionable ("yes" to Question 3)	0.584	0.769	0.808	0.907	0.888
Wanted odor reduced ("yes" to Question 4)	0.696	0.831	0.889	0.938	0.927
Of those who perceived odor, fraction which:					
Experienced it; very often	0.280	0.374	0.467	0.422	0.422
fairly often	0.345	0.274	0.256	0.310	0.309
occasionally	0.321	0.308	0.208	0.226	0.235
never	0.054	0.043	0.069	0.042	0.014
Experienced it; indoors	0.080	0.063	0.076	0.044	0.040
outdoors	0.738	0.774	0.799	0.822	0.842
both indoors and outdoors	0.181	0.164	0.125	0.134	0.118
Found odor objectionable ("yes" to Question 3)	0.659	0.793	0.827	0.909	0.895
Wanted odor reduced ("yes" to Question 4)	0.785	0.856	0.909	0.941	0.935

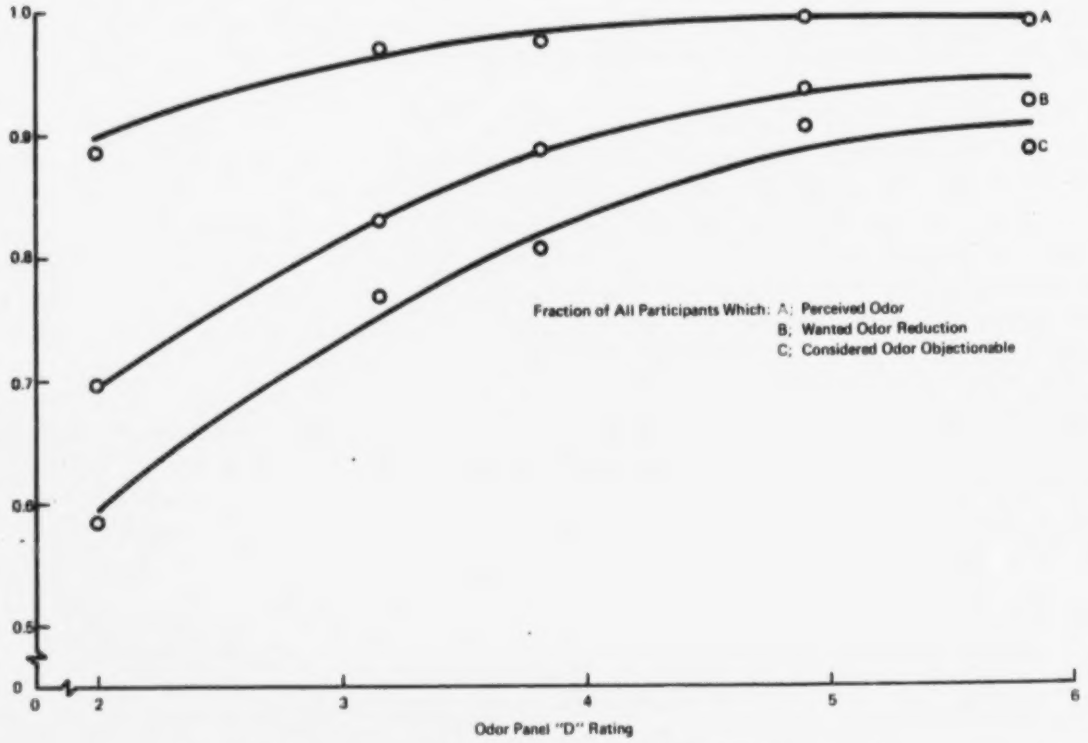

Figure 24. Responses to Questions 1, 3, and 4 on Back of Questionnaire

intensities, but the importance of the "noise" effect becomes smaller and smaller as the strength of the "signal" increases. It is doubtful that the "noise" had any appreciable significance for odors more intense than "D-3".

The responses to Questions 3 and 4 on the back of the questionnaire were very similar (curves C and B of Figure 24, respectively), which was to be expected. Not expected, however, was the consistent margin by which "yes" responses to Question 4 on desirability of odor reduction outscored those to Question 3 on odor objectionability. It does not seem reasonable that people who do not consider odors objectionable would want them reduced, but perhaps these people who answered "yes" to Question 4 and "no" to Question 3 were saying, "I don't find the odor objectionable myself, but perhaps others would, so I'll indicate that it should be reduced just to be on the safe side." Table 11 gives an indication of the pattern of responses to Questions 3 and 4. Note that very few participants answered "yes" to Question 3 and "no" to Question 4, but that a somewhat larger number answered "yes" to Question 4 and "no" to Question 3.

Table 11. Responses to Questions on Objectionability and Odor Reduction

Possible Combinations of Answers to Questions		Fraction of Those Who Perceived an Odor Which Answered Questions 3 and 4 as Shown at Left for Each Nominal Odor Intensity				
3 (Odor Objectionability)	4 (Desirability of Odor Reduction)	2	3	4	5	6
Yes	Yes	0.649	0.779	0.798	0.889	0.881
Yes	No	0.011	0.013	0.028	0.021	0.014
No	Yes	0.136	0.077	0.111	0.052	0.054
No	No	0.204	0.131	0.063	0.038	0.051

It appears that curves B and C of Figure 24, as well as Curve A and the data presented in Tables 10 and 11, approach constant ordinates as the odor intensity progresses beyond some point. These data (in Tables 10 and 11) exhibit a considerable amount of "scatter," which is characteristic of statistics based on small samples, but they seem to show little or no dependence on odor intensity above the nominal "D-5" level.

As further illustrations of this point, Figures 25 and 26 have been prepared using data from Table 10. Some scatter is again in evidence in the curves of Figure 25, but it is evident that they are approaching constant values as the odor becomes more intense. It is also interesting to note that the odors were

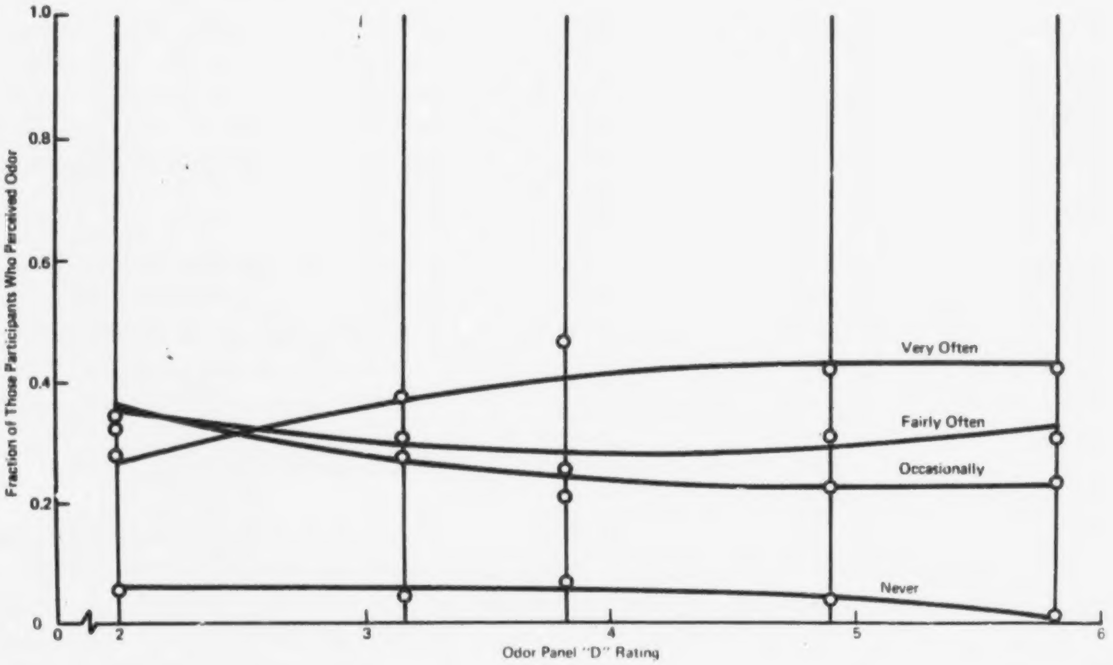

Figure 25. Responses to First Part of Question 2, Back of Questionnaire

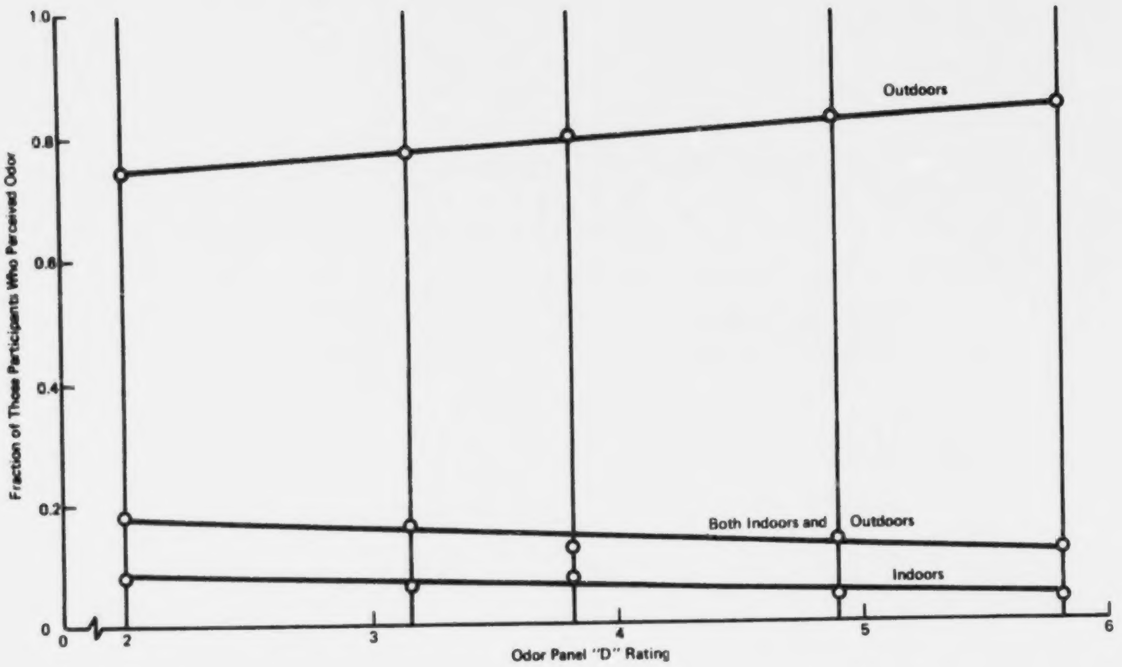

Figure 26. Responses to Second Part of Question 2, Back of Questionnaire

experienced either "very often" or "fairly often" by over 70 percent of the participants who perceived an odor for nominal "D-4" or greater intensities. Figure 26 shows responses to the second part of Question 2 on whether the odor is found indoors or outdoors as functions of odor intensity, and the increasing fraction of people identifying the odor as being "outdoor" in character as the intensity increases supports the hypothesis that the participants tacitly identified the odor, and that an increasing number did so correctly as the odor intensity increased.

Referring to all the data presented and discussed thus far, the general conclusions to be drawn are about the same as those drawn from the 1969 survey. Although the absolute levels differ slightly, the responses to diesel odors in terms of the cartoon scale are very similar for the 1969 and 1970 surveys; that is, people consistently ranked strong diesel odors further toward the "objectionable" end of the cartoon scale than mild diesel odors. One intent of the 1970 survey was to eliminate the "history" or previous experience effect from the participants' evaluations of odors above the "D-2" level, and this goal has been accomplished. Figure 23 shows responses to the nominal "D-2", "D-4", and "D-6" odor levels for both surveys, indicating that the "history" effect tended to decrease the cartoon-number response to the strongest odor, although slightly.

As a portion of the questionnaire validation for the 1969 survey, the cartoon characters were correlated with a numerical scale ranging from 0 (pleasant) to 100 (most objectionable).(1) These correlation studies were entirely independent of the public opinion survey itself, and consisted of having people place five "pointers" with the cartoons printed on them along the 0-to-100 scale wherever each person felt they belonged. The correlation equation turned out to be:

$$\text{position on objectionability scale} = 22.32 \times (\text{cartoon number}) - 15.95.$$

This equation was derived by the method of least squares using data from independent studies done by NORC and SwRI. Since no alterations were made to the cartoon scale for the 1970 survey, it is assumed that the correlation still holds. Figure 27, then, presents several ways of looking at the objectionability of the diesel odors tested in both the 1969 and 1970 surveys. The top curve marked "1970 Question 3 on Objectionability" is a duplicate of curve C in Figure 24, the second curve shows answers to the 1969 question, "Are any of these odors so bad that someone should take steps to reduce them?", while the other

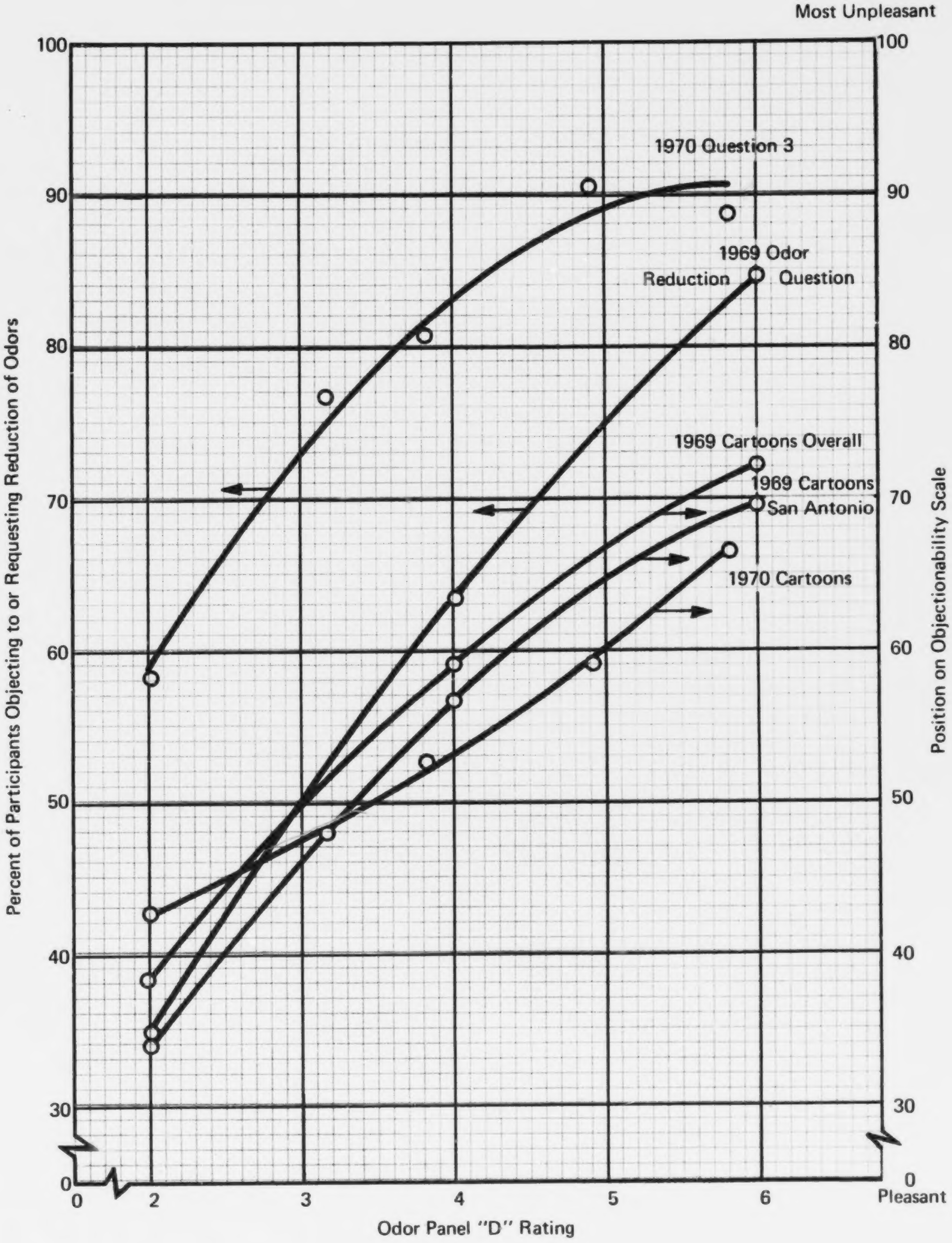

Figure 27. Objectionability Results of 1969 and 1970 Surveys

three lines result from application of the above correlation equation to cartoon scale responses. More specifically, the three lower curves were generated by plugging the average cartoon response values from the 1969 overall, the 1969 San Antonio, and the 1970 surveys, respectively, into the correlation equation given above. There is obviously a measurable difference between asking people directly whether or not they find an odor objectionable and relating their cartoon responses to an objectionability scale. It also seems that the way a question is asked may have an effect on the response. The following excerpts are from a letter by Mr. Paul Sheatsley of NORC (with collaboraton by Dr. Ben King) giving comments on preliminary results.

A copy of this letter in its entirety, as well as other pertinent materials from NORC, is included in Appendix A of this report.

"These questions [on objectionability and odor reduction] were not asked in last year's study, where the most closely related question was 'Are any of these odors so bad that someone should take steps to reduce them? IF YES, Which ones?' In San Antonio in 1969 only 23 percent of the respondents said the D-2 (Test 1) odor was that bad. True, this response was offered after the respondents had been exposed to the higher levels, thus making it seem less unpleasant by comparison. But this can hardly account for the difference between 23 percent last year who said it was so bad that someone should take steps to reduce it, and the 68 percent this year who said it should be reduced.

"In our view, the two questions asked this year must be interpreted extremely carefully. The responses at the 0 level are indicative [the reader should refer to the section on the nominal "D-0" odor at this point]. Here, 176 persons said they did not smell anything but 178 said the odor should be reduced.

"It would seem that the two questions in the present study are tapping a much broader domain of opinion than the respondent's actual experience in the Sniffmobile. While people seem to be rating the particular odor they have just been exposed to when they mark their cartoon ratings, the intrusion of questions about odor reduction and objectionability may shift their consideration to broader questions of environmental pollution.

"The first question asks if it is objectionable, and in these days of publicity about pollution, it is perhaps natural for many people to say that any odor, unless obviously pleasant, is objectionable. It is interesting that more people say the odor should be reduced than find it objectionable; this is true at every D level.

"It seems that the question 'Should this odor be reduced?' is pretty hard to say No to. It may well be true that public opinion is more anti-odor this year than last year, but we feel that last year's question was a better one. 'Is the odor *so bad* that *someone should take steps* to reduce it?' suggests that the odor is not just mildly unpleasant but is really so bad that someone, presumably at a certain effort or cost, should take action against it. Even if administered after a single test of one "D" level, we believe this question would produce fewer Yes answers than the question, 'Should this odor be reduced?' "

B. Response Data and Characteristics of Participants, Nominal "D-0" Odor Intensity

This experiment is similar in some ways to the experiments involving characterization of diesel exhaust odors, but in other ways it is fundamentally different. It is similar because the Sniffmobile was used, because people were solicited to help with the survey, and because the instructions, questionnaire, and experimental plan did not change. It is different because the odor presented was almost undetectable and was entirely dissimilar to diesel exhaust odor, because the participants expected to experience an odor due to the bulk and complexity of the survey apparatus and the presence of the survey crew, and because the majority of the questionnaire was inapplicable to all the participants who did not perceive an odor. The survey crew reported that many of the participants became quite confused when the odor sample was presented, apparently not sure whether they smelled anything or not. This confusion may be responsible for some illogical responses.

Table 12 gives a summary of questionnaire responses to the nominal "D-0" odor intensity. An unexpectedly large number of participants (60.4 percent) indicated that they perceived an odor. Although unexpected, this result is not unreasonable considering that the participants *thought* they would perceive an odor, which probably shifted their response criteria toward lower levels of stimulation.(4) Cartoon-scale responses to this very mild odor averaged 2.33, or slightly above "neutral" on the scale. If absolutely no odor had been present and if the participants had been completely unbiased, an even 2.00 (neutral) would have been the expected result. In fact, however, a slight "dusty" (as characterized by the odor panel) residual odor was present in the ductwork, and there was certainly nothing pleasant about this odor, hence the observed response is not unreasonable.

The responses to Question 2 on the back of the questionnaire indicate that the participants had experienced the "nominal D-0 odor" less frequently than any of the other odors, and that they disagreed with each other more strongly about where the odor had been perceived. These results indicate a poor ability to recognize the odor, which in turn suggests that, in some cases, the "perception" of an odor was an effect caused by noise rather than signal (or stimulus). The answers to questions on odor objectionability

Table 12. Summary of Data–Test Site 06

Nominal "D" level of odor presented	0
Actual "D" level of odor presented	0.38

Number of participants	445
Sex:	
Male	205
Female	240
Age:	
15-24	113
25-34	106
35-44	83
45-64	101
65 and over	42
Education:	
0-8 yr	57
Some high school	96
Completed high school	144
Some college	111
Completed 4 yr college	37
Activity:	
Employed	222
Housewife	143
Student	29
Retired	40
Other	11
Employment:	
Professional	55
Clerical	52
Skilled	86
Other	29
Income:	
Under $4,000	101
$ 4,000-$6,999	136
$ 7,000-$9,999	102
$10,000-$14,999	76
$15,000 or more	30

Did you smell anything?	
Yes	269
No	176
Cartoon response:	
Pleasant (1)	31
Neutral (2)	134
Unpleasant (3)	88
Very unpleasant (4)	16
Unbearable (5)	0
How often have you experienced this odor?	
Very often	37
Fairly often	57
Occasionally	139
Never	36
If you have experienced the odor, where?	
Indoors	41
Outdoors	140
Both indoors and outdoors	52
If you were to experience an odor just like this outdoors, would you find it objectionable?	
Yes	146
No	123
If an odor just like this occurred outdoors, should someone take steps to reduce it?	
Yes	178
No	91

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Sex:		No	176
Male	205		
Female	240		
		Cartoon response:	
Age:		Pleasant (1)	31
15-24	113	Neutral (2)	134
25-34	106	Unpleasant (3)	88
35-44	83	Very unpleasant (4)	16
45-64	101	Unbearable (5)	0
65 and over	42		
Education:		How often have you experienced this odor?	
0-8 yr	57		
Some high school	96	Very often	37
Completed high school	144	Fairly often	57
Some college	111	Occasionally	139
Completed 4 yr college	37	Never	36
Activity:			
Employed	222	If you have experienced the odor, where?	
Housewife	143		
Student	29	Indoors	41
Retired	40	Outdoors	140
Other	11	Both indoors and outdoors	52
Employment:			
Professional	55	If you were to experience an odor just like this outdoors, would you find it objectionable?	
Clerical	52		
Skilled	86		
Other	29	Yes	146
		No	123
Income:			
Under $4,000	101		
$ 4,000-$6,999	136	If an odor just like this occurred outdoors, should someone take steps to reduce it?	
$ 7,000-$9,999	102		
$10,000-$14,999	76	Yes	178
$15,000 or more	30	No	91

C. Effects of Demographic Variables on Odor Responses

In the analysis of the 1969 survey data, quite a bit of attention was given to the effects of demographic variables, but, in the case of the 1970 data, a more concise treatment should be sufficient. Table 13 is a summary of the effects of demographic variables on the cartoon-scale odor ratings and the questions regarding odor objectionability and odor control. To present these data graphically and to minimize scatter due to small samples, the following functions were computed for each level of each category (e.g., males, females, the 15 to 24 age group, . . ., etc.) listed in Table 13.

Table 13. Effects of Demographic Variables on Odor Responses

Category and Level	Average Cartoon Response at Nominal Intensity					Fraction of Category Which Objected to Nominal Intensity					Fraction of Category Which Wanted Reduction of Nominal Intensity				
	D-2	D-3	D-4	D-5	D-6	D-2	D-3	D-4	D-5	D-6	D-2	D-3	D-4	D-5	D-6
Sex: Male	2.46	2.78	3.05	3.44	3.54	0.602	0.743	0.845	0.956	0.895	0.747	0.799	0.906	0.930	0.925
Female	2.76	2.95	3.11	3.32	3.79	0.701	0.844	0.801	0.879	0.895	0.816	0.916	0.912	0.948	0.941
Age: 15-24	2.46	2.90	2.96	3.25	3.73	0.581	0.732	0.772	0.867	0.889	0.819	0.859	0.931	0.900	0.963
25-34	2.76	2.94	3.33	3.39	3.66	0.745	0.846	0.846	0.883	0.902	0.816	0.885	0.897	0.961	0.927
35-44	2.68	2.72	3.11	3.47	3.75	0.720	0.795	0.852	0.972	0.930	0.805	0.820	0.944	0.944	0.930
45-64	2.79	2.95	3.05	3.35	3.59	0.657	0.872	0.885	0.925	0.866	0.761	0.907	0.902	0.938	0.915
65 and up	1.93	2.71	2.70	3.44	3.84	0.267	0.686	0.783	0.941	0.892	0.333	0.765	0.783	0.970	0.946
Education: 0-8 yr	2.23	2.77	2.90	3.42	3.90	0.423	0.721	0.788	0.879	0.854	0.577	0.791	0.846	0.970	0.896
9-11 yr	2.33	2.83	2.89	3.25	3.59	0.553	0.754	0.742	0.906	0.875	0.724	0.831	0.822	0.924	0.969
12 yr	2.64	2.89	3.14	3.45	3.69	0.723	0.818	0.833	0.954	0.919	0.832	0.875	0.939	0.954	0.946
13-15 yr	2.71	3.00	3.16	3.29	3.67	0.686	0.849	0.890	0.891	0.926	0.800	0.930	0.973	0.924	0.926
16 yr or more	2.78	2.47	3.23	3.50	3.67	0.732	0.706	0.859	0.909	0.833	0.854	0.647	0.938	0.954	0.917
Income: under $4,000	2.19	2.92	2.89	3.31	3.88	0.544	0.690	0.771	0.844	0.926	0.667	0.760	0.844	0.922	0.956
$ 4,000-$ 6,999	2.63	2.83	3.16	3.27	3.70	0.667	0.760	0.814	0.935	0.848	0.772	0.803	0.942	0.984	0.929
$ 7,000-$ 9,999	2.71	2.95	3.13	3.46	3.52	0.770	0.893	0.868	0.919	0.913	0.874	0.973	0.924	0.905	0.935
$10,000-$14,999	2.65	2.80	3.08	3.44	3.71	0.622	0.870	0.824	0.930	0.905	0.805	0.889	0.902	0.982	0.936
$15,000 or more	2.52	2.75	3.32	3.30	3.74	0.592	0.714	0.968	0.933	0.903	0.741	0.857	1.000	0.900	0.903

N_1 = *normalized cartoon response*

= *(sum of average cartoon numbers chosen by members of category) ÷ (sum of average cartoon numbers chosen by all participants)*

N_2 = *normalized objectionability response*

= *(sum of fractions of category which considered odors objectionable) ÷ (sum of fractions of all participants who considered odors objectionable)*

N_3 = *normalized odor control response*

= *(sum of fractions of category which wanted odor reduction) ÷ (sum of fractions of all participants who wanted odor reduction)*

The normalized responses are a way of combining the responses of each demographic group to all the odors presented, and thereby working with a larger sample. Values of "N" over 1.00 indicate a higher-than-average response for the demographic group, and values below 1.00 indicate a lower-than-average response. All these calculations are based only on the groups who perceived an odor.

As an example, the normalized responses of males and females will be computed using the top two lines of data from Table 13, the last column from Table 9, and the last two lines from Table 10. From Table 9, the sum of average cartoon numbers chosen by all participants is 2.63 + 2.87 + 3.08 + 3.37 + 3.70 = 15.65. From Table 13, the sum of average cartoon numbers for males is 2.46 + 2.78 + 3.05 + 3.44 + 3.54 = 15.27, and the sum of average cartoon numbers for females is 2.76 + 2.95 + 3.11 + 3.32 + 3.79 = 15.93. Therefore N_1 for males equals 15.27 ÷ 15.65 = 0.976, and N_1 for females equals 15.93 ÷ 15.65 = 1.018.

From Table 10, the sum of fractions of all participants who considered odors objectionable is 0.659 + 0.793 + 0.827 + 0.909 + 0.895 = 4.083, and the sum of fractions of all participants who wanted odor reduction is 0.785 + 0.856 + 0.909 + 0.941 + 0.935 = 4.426. From Table 13, the sum of fractions who considered odors objectionable for males is 0.602 + 0.743 + 0.845 + 0.956 + 0.895 = 4.041, and the sum of fractions who wanted odor reduction for males is 0.747 + 0.799 + 0.906 + 0.930 + 0.925 = 4.307. As a result, N_2 for males equals 4.041 ÷ 4.083 = 0.990, and N_3 for males equals 4.307 ÷ 4.426 = 0.973. Similar calculations for females yield N_2 = 1.009 and N_3 = 1.024.

Table 14. Normalized Responses for Each Category and Level

Category and Level	N_1	N_2	N_3
Sex: Male	0.976	0.990	0.973
Female	1.018	1.009	1.024
Age: 15-24	0.978	0.941	1.010
25-34	1.027	1.034	1.014
35-44	1.005	1.046	1.004
45-64	1.005	1.030	0.999
65 and up	0.934	0.874	0.858
Education: 0-8 yr	0.973	0.898	0.922
9-11 yr	0.951	0.938	0.965
12 yr	1.010	1.040	1.027
13-15 yr	1.012	1.039	1.029
16 yr or more	1.000	0.989	0.974
Income: under $4,000	0.971	0.925	0.937
$ 4,000-$ 6,999	0.996	0.986	1.001
$ 7,000-$ 9,999	1.008	1.069	1.042
$10,000-$14,999	1.002	1.017	1.020
$15,000 or more	0.999	1.007	0.994

Table 14 summarizes the normalized responses for each level of the categories sex, age, education, and income, and Figures 28a through 28d present these data graphically. The effect of sex is qualitatively the same for both the 1969 and 1970 surveys, and the effects of age are also very similar. The effects of education and income for the 1970 survey are similar to those for the 1969 survey from the bottom through about the middle of each category, but the 1970 results show a drop-off in response for the upper income and education categories in contrast to the climb shown by the 1969 results. The possible explanations of this result are a change in attitudes among the more affluent, better educated classes, or a change in attitudes among the middle-income group. If the former is the case, it is probably due to a sobering effect among better educated people who have begun to appreciate the costs involved in air quality improvement. If the latter is the case, it is probably because the commitment to improve the environment is filtering down through the ranks to the less affluent and less educated.

D. Additional Data Analysis

Based on preliminary Sniffmobile data, Dr. Turk wrote a linear equation correlating cartoon scale responses with the "D" or diesel composite rating of the odor presented.[(4)] More accurate data are available now, and applying the method of least squares[(6)] to data presented in Tables 1 and 9, the equation which results is

$$\text{cartoon number} = 2.03 + 0.280 \times (\text{"D" rating of odor})$$

Whether or not this equation adequately represents the relationship between objectionability and diesel odor intensity in general is not known, but it does fit the data taken in this study rather well. It should be noted, however, that, while the estimated cartoon numbers are very close to the observed ones, the observed relationship tends to be slighty concave upward rather than completely linear. Table 15 gives a summary of the curve-fit data, and Figure 29 shows both observed and estimated (from the improved linear correlation equation above) relationships between cartoon numbers and diesel composite intensity numbers.

Dr. Turk's comments also included a suggestion that the numbers associated with the cartoons be changed from the present 1 through 5 to a −1, 1, +1, +2, +3 sequence to represent more realistically the Hedonic scale.[(4)] The new numbering system would assign a value of zero to the "neutral" cartoon, which is consistent with recent thought in Hedonic scaling. The new system would make the relationship between odor "D" intensity and cartoon-scale rating (almost) directly proportional, as shown by the revised linear correlation equation

$$\text{cartoon number} = 0.03 + 0.280\,(\text{"D"}) \cong 0.280\,(\text{"D"})$$

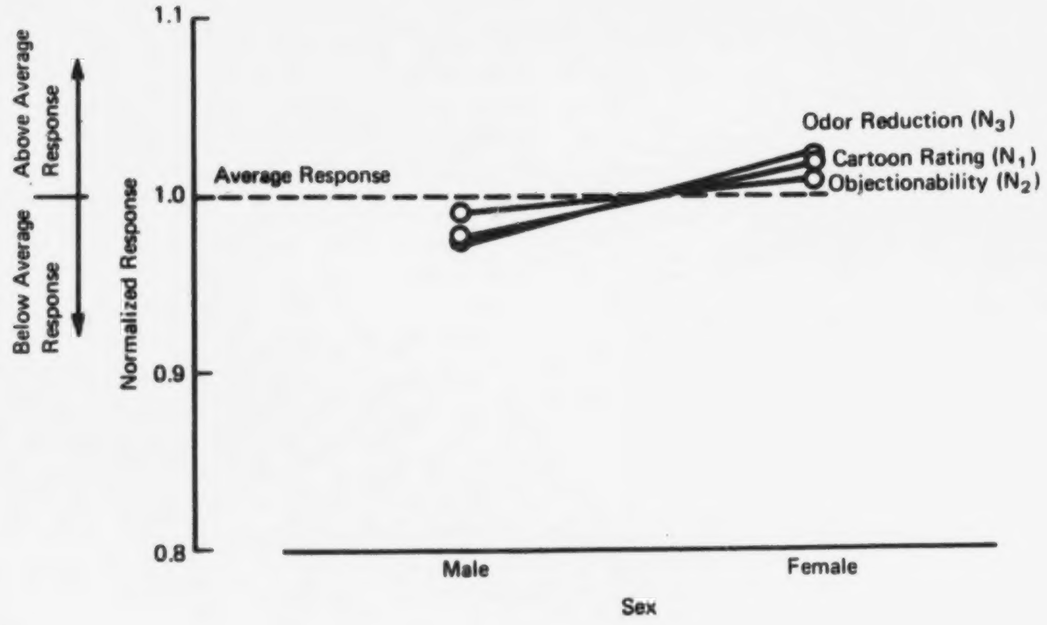

Figure 28a. Effect of Sex on Odor Responses

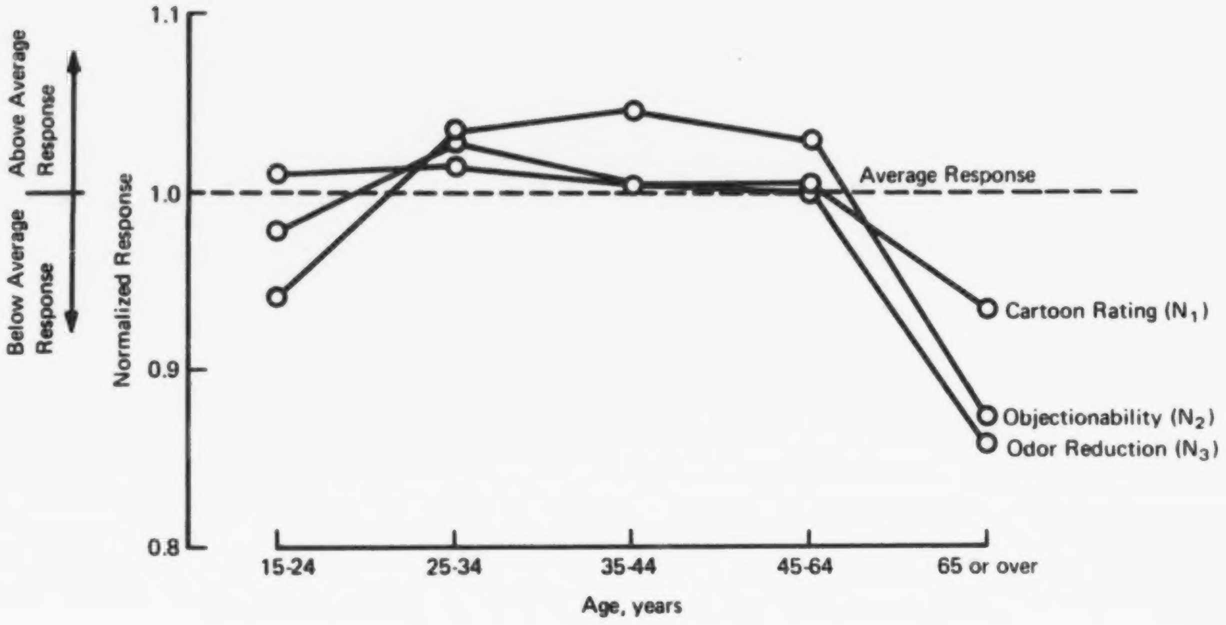

Figure 28b. Effect of Age on Odor Responses

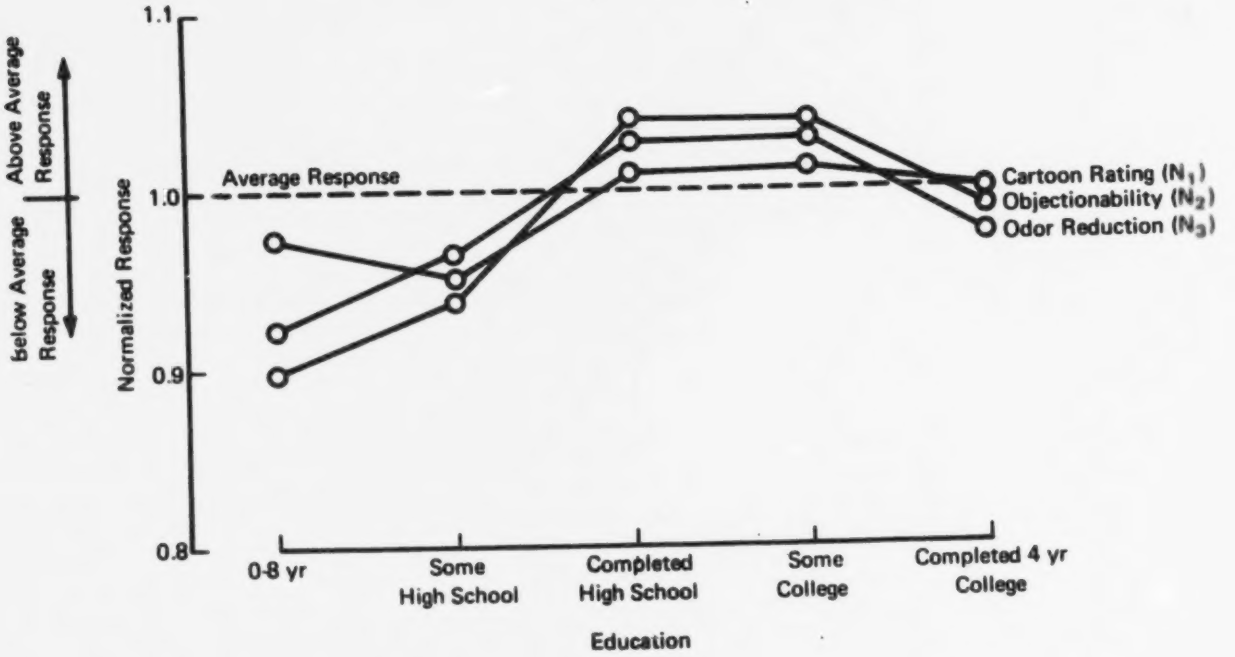

Figure 28c. Effect of Education on Odor Responses

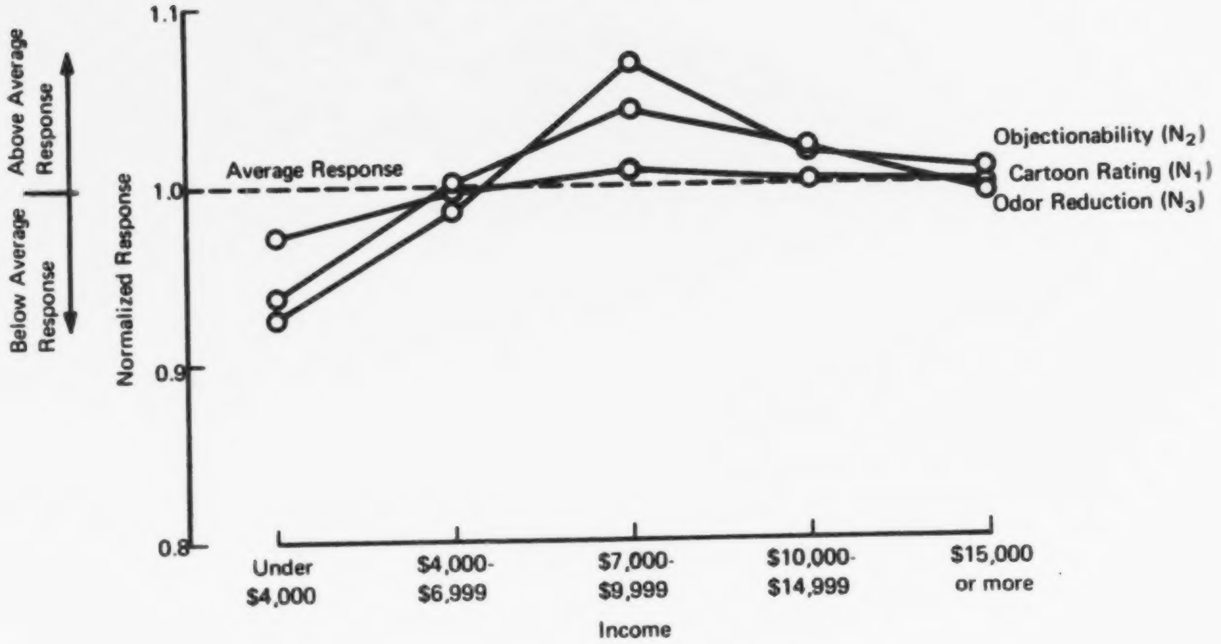

Figure 28d. Effect of Income on Odor Responses

Table 15. Observed and Estimated Average Cartoon Responses

Actual Odor "D" Intensity	Observed Average Cartoon Rating	Estimated Cartoon Rating	$(\text{Error})^2 = e^2$	Direction of Error of Estimate
2.00	2.63	2.59	0.0016	low
3.16	2.87	2.91	0.0016	high
3.82	3.08	3.10	0.0004	high
4.90	3.37	3.40	0.0009	high
5.82	3.70	3.66	0.0016	low
			$\Sigma e^2 = 0.0061$	

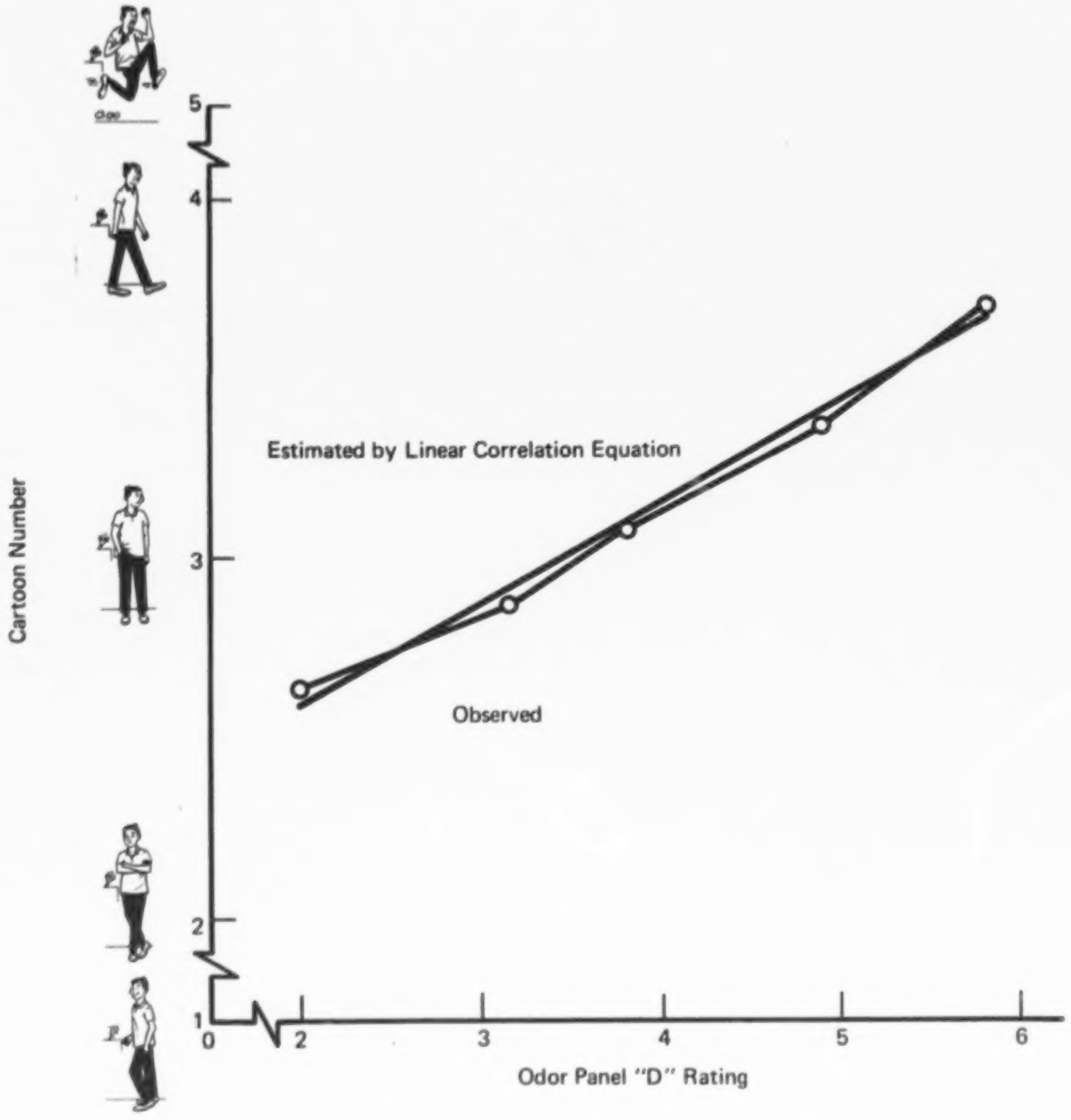

Figure 29. Comparison of Observed and Estimated Cartoon-Numbers

The suggested change, although an excellent one, has not been adopted throughout this report because it might confuse readers who refer to the report on the 1969 survey to have to cope with different scales. It should be noted that the conversion, for readers wishing to use the new scale, is simply a matter of subtracting 2 from the existing cartoon numbers wherever they are found.

Another type of data analysis attempted was "weighting" of the data in such a manner as to correct for sampling errors. In other words, the idea was to give more weight to individual questionnaires submitted by members of demographic groups which were under-represented in the sample, and vice versa. The results of this analysis did not live up to expectations, and so they have been omitted from this report. Each individual sampled was classified according to sex, age, and education. Since the questionnaire provides 2 levels of the sex variable, 5 levels of the age variable, and 5 levels of the educations variable, the number of the classifications which resulted was 2 × 5 × 5 = 50. Mrs. Carol Richards of NORC provided a joint distribution of the United States population (1960 census) giving the fraction of the population which fell into each sex-age-education classification, and this distribution was used as the standard throughout the analysis (for data see Appendix A, Table A-2).(3) The sample surveyed at each test site was restructured by computer to conform to the standard joint distribution, and the average cartoon-scale odor ratings, the fraction of the sample finding the odor objectionable, and the fraction of the sample wanting reduction of the odor were then computed again based on the restructured sample. The fault in this analysis lies in its application to samples containing relatively small numbers. For example, the largest sample to which the analysis was applied was under 450 persons, or an average of less than 9 persons per classification. Since the sampling was not perfect, several of the classifications were not represented at all in this sample of 450 persons (6, to be exact), 22 classifications contained from 1 to 4 participants, and only 10 classifications contained 10 or more participants. To make such analysis really effective, 10 persons representing each classification is probably an acceptable minimum, which would require a sample numbering in the thousands. This requirement is obviously beyond the scope of the current project, and the weighting procedure, therefore, will not be pursued any further.

VII. APPLICATION OF RESULTS IN CONJUNCTION WITH INFORMATION ON ODOR CONTROL TECHNOLOGY

The primary objective of this study has been to provide information relating diesel odor intensity to public opinion. This information can properly be applied in situations such as determining the effectiveness of a diesel odor control measure in terms of public opinion when the effectiveness in terms of reducing diesel odor intensity is already known.

As an example, a reduction of exhaust odor from city buses powered by Detroit Diesel 6V-71E engines can be effected by substituting improved needle valve (LSN) injectors for the standard crown valve (S) injectors. This reduction in odor can be illustrated by data in Table 16 and the bar graphs shown in Figure 30. The data were taken at the beginning and end of a 4-month fleet test, and apply to one bus which was typical of the group of three. Six operating conditions which are typical of municipal bus operation were used to characterize exhaust odors (three part-power cruise conditions, a low idle, an acceleration preceded by an idle, and a deceleration preceded by a cruise). The results of this fleet test were described in detail in the final report of Part IV of the long-range investigation of diesel emissions for Environmental Protection Agency(7) and have been confirmed by the manufacturer's own tests.(8)

Table 16. Comparison of Odor Ratings, Four-Month Fleet Test of Improved (LSN) Injectors

Operating Conditions	Injector	"D" Composite		"B" Burnt		"O" Oily		"A" Aromatic		"P" Pungent	
		Start	End	Start	End	Start	End	Start	End	Start	End
20 mph 40 hp	60S	5.5	5.6	1.7	2.0	1.3	1.7	1.1	1.1	1.0	0.8
	60LSN	4.8	4.0	1.5	1.4	1.2	1.0	1.1	0.9	0.9	0.6
	Net Change	−0.7	−1.6	−0.2	−0.6	−0.1	−0.7	–	−0.2	−0.1	−0.2
	U_S Statistic	*	0	*	0	*	0	*	2	*	*
30 mph 40 hp	60S	4.5	5.4	1.4	1.8	1.1	1.6	1.2	1.0	0.9	0.9
	60LSN	3.5	3.2	1.2	1.0	1.0	0.8	1.0	0.8	0.6	0.4
	Net Change	−1.0	−2.2	−0.2	−0.8	−0.1	−0.8	−0.2	−0.2	−0.3	−0.5
	U_S Statistic	1.5	0	0.5	0	*	0	*	1	0	0
40 mph 40 hp	60S	5.5	5.4	1.6	1.8	1.4	1.3	1.2	1.0	1.0	1.0
	60LSN	3.4	3.1	1.1	1.0	1.0	0.9	1.0	0.7	0.6	0.4
	Net Change	−2.1	−2.3	−0.5	−0.8	−0.4	−0.4	−0.2	−0.3	−0.4	−0.6
	U_S Statistic	0	0	0	0	0	0	*	0	0	0
Idle	60S	6.0	5.3	1.9	1.7	1.4	1.3	1.4	1.3	1.1	0.9
	60LSN	5.8	5.3	1.8	1.8	1.3	1.2	1.4	1.1	1.0	0.9
	Net Change	−0.2	0	−0.1	+0.1	−0.1	−0.1	–	−0.2	−0.1	0
	U_S Statistic	*	*	*	*	*	*	*	*	*	*
Idle-Acceleration	60S	6.3	6.3	2.0	2.1	1.8	1.8	1.2	1.1	1.2	1.1
	60LSN	5.4	4.8	1.7	1.6	1.2	1.2	1.2	1.1	0.8	0.6
	Net Change	−0.9	−1.5	−0.3	−0.5	−0.6	−0.6	–	0	−0.4	−0.5
	U_S Statistic	1.5	0	*	0	2	0.5	*	*	0.5	0
Deceleration	60S	7.4	7.2	2.4	2.2	1.9	1.6	1.5	1.5	1.6	1.7
	60LSN	4.2	2.7	1.4	0.9	1.1	0.7	1.3	0.9	0.6	0.4
	Net Change	−3.2	−4.5	−1.0	−1.3	−0.8	−0.9	−0.2	−0.6	−1.0	−1.3
	U_S Statistic	0	0	0	0	0	0	0.5	0	0	0

*U_S statistic greater than 2–no statistical difference apparent.

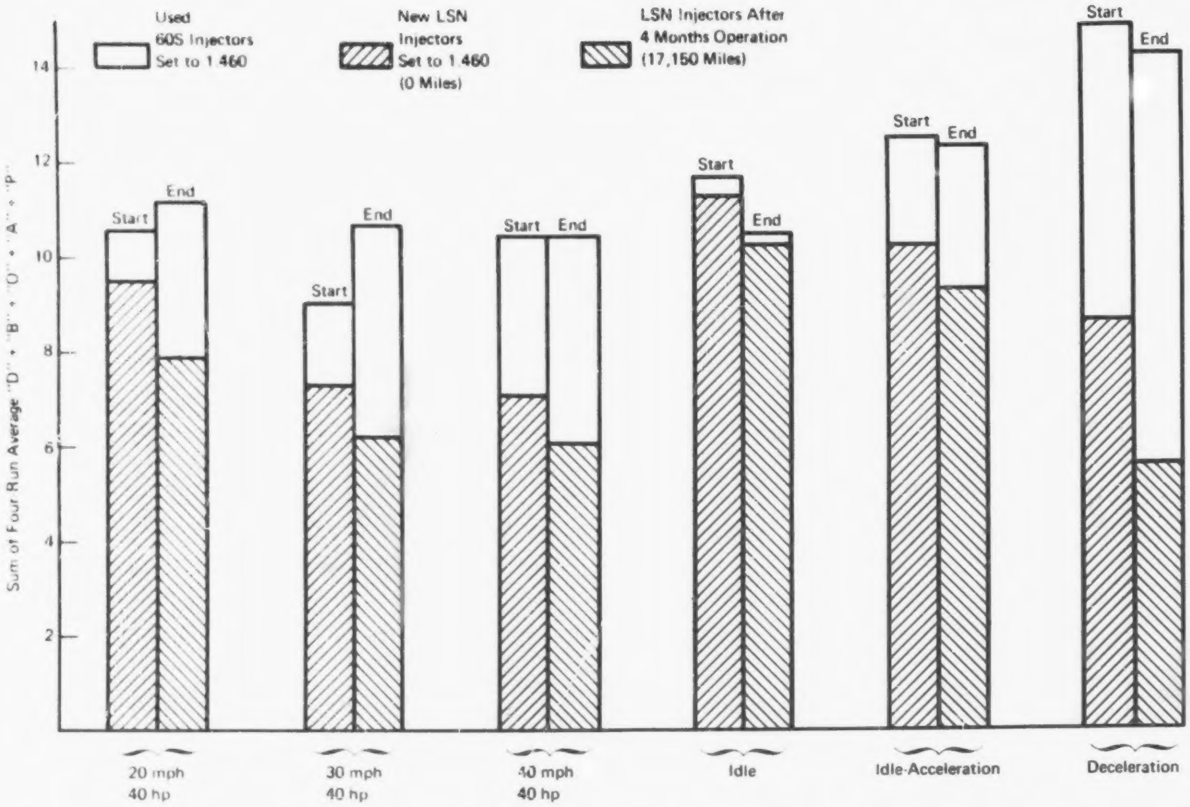

Figure 30. Comparison of Odor Ratings from a City Bus, 4-Month Fleet Test of Improved (LSN) Injectors

The Table 16 data include odor intensities and qualities in terms of the "D", "B", "O", "A", and "P" reference standards of the PHS Quality-Intensity kit, the net change between "S" and "LSN" injectors, and the U_s statistic. This latter quantity is computed by a nonparametric rank analysis, and the value zero indicates the highest significant differences between sets of injectors while values greater than two indicate no significant statistical difference between results with the "S" and with the "LSN" injectors. Figure 30 shows the same data in a slightly different form. The white (taller) bars represent the sum of odor ratings for the "S" injectors (D+B+O+A+P), and the cross-hatched bars overlaid on the white bars represent the "LSN" injectors. The results at the beginning and the end of the 4-month test are fairly consistent, but in all cases the odor ratings with "LSN" injectors were somewhat lower after 4 months' operation in normal city bus service. Marked reductions in odor levels with the improved injectors were observed in all cases except idle, a very common condition in city bus operation, where only a minor odor reduction was noted.

Summarizing these data, an average reduction in odor intensity of 1.7 "D" numbers, from 5.9 to 4.2, was realized by the injector change, and corresponding reductions of the quality ratings also occurred. This change is numerically quite significant (a reduction of approximately 29 percent in "D" numbers), and replacement of injectors involves a nominal charge for either new or modified exchange injectors and is normally about a two-man, 3-hour job. At this point, we have the reduction odor intensity, and we can use the results of the Sniffmobile study to determine the effectiveness of the control measure in terms of public opinion. Referring to Figure 27, about 90 percent of the 1970 Sniffmobile participants would have found a "D-5.9" intensity objectionable, and about 85 percent would have found a "D-4.2" intensity objectionable, according to answers to the direct objectionability question. Simply put, the objectionability of the odor was reduced by only about 5 percent. Using the other four curves in Figure 27, the reductions calculated are 21 percent for the 1969 odor reduction question, 15 percent for the 1969 cartoons overall, 16 percent for the 1969 cartoons in San Antonio, and 19 percent for the 1970 cartoons. This change in public objectionability, no matter which percentage is considered most reliable, is not very significant compared to the odor reduction itself. A much greater impact would be realized by a similar numerical intensity reduction if the baseline had been at, say, "D-4" rather than at "D-5.9". For example, a reduction from

"D-4" to "D-2", which is a low intensity, would result in a 30- to 45-percent reduction in public objectionability, depending on which curve in Figure 27 is used. A reduction of this magnitude would be even more significant, and would likely result in many fewer complaints about diesel exhaust odor.

In summary of this section, then, odor reductions achieved by known control methods may or may not have a significant impact on objectionability of or complaints about the odor. The extent to which a given reduction will reduce the "complaint-potential" of the odor depends on the baseline odor level before the reduction is made. This result is not too surprising, but, for the first time, a quantitative appraisal can be made of control technology in terms of public acceptance.

LIST OF REFERENCES

1. Springer, Karl J., and Hare, Charles T., "A Field Survey to Determine Public Opinion of Diesel Engine Exhaust Odor," Final Report to the National Air Pollution Control Administration on Contract No. PH 22-68-36, February 1970.

2. Correspondence from National Opinion Research Center to Charles T. Hare, dated April 22, 1970 (included as part of Appendix A).

3. Correspondence from National Opinion Research Center to Charles T. Hare, dated September 12, 1970 (included as Tables A-1 and A-2 of Appendix A).

4. Turk, Amos, "Comments on SwRI Quarterly Progress Report No. 3 on 'Study of Public Response to Diesel Engine Exhaust Odors,' " February 15, 1971 (included as part of Appendix A).

5. Correspondence from National Opinion Research Center to Charles T. Hare, dated December 16, 1970 (included as part of Appendix A).

6. Pirie, Alexander A., "Linear Regression Analysis," topic in *Statistics for the Engineer,* S.A.E. publication No. SP-250, December 1963.

7. Springer, Karl J., "An Investigation of Diesel-Powered Vehicle Odor and Smoke - Part IV," Final Report to the Environmental Protection Agency on Contract PH-22-68-23, April 1971.

8. Ford, H.S., Merrion, D.F., and Hames, R.J., "Reducing Hydrocarbons and Odor in Diesel Exhaust by Fuel Injector Design," SAE Paper No. 700734, presented at Combined National Farm, Construction, and Industrial Machinery and Powerplant Meetings, Milwaukee, Wisconsin, September 14-17, 1970.

APPENDIX A

INPUT FROM CONSULTANTS: NATIONAL OPINION RESEARCH CENTER; DR. AMOS TURK

TABLE A-1. U.S. PERCENT DISTRIBUTIONS (1968 CURRENT POPULATION SURVEY)

Sex:		Age by Sex:	
Male 15+	48.5	Male:	
Female 15+	51.5	14-24	25.4
		25-34	16.8
Age:		35.44	17.0
14-24	25.1	45-64	28.7
25-34	16.4	65+	12.0
35-44	16.6	Female:	
45-64	28.5	14-24	24.8
65+	13.3	25-34	16.0
Years of School Completed (Persons 14 yr and over):		35-44	16.3
		45-64	28.3
		65+	14.6
≤ 8 yr	27.9		
9-11 yr	22.1	Income (Family)–1967:	
12 yr	30.7	< \$4,000	18.8
13-15 yr	10.6	\$ 4,000-\$6,999	22.6
16+ yr	8.7	\$ 7,000-\$9,999	24.3
		\$10,000-\$14,999	22.4
		\$15,000 and over	12.0

Received in communication from NORC on September 12, 1970.

TABLE A-2. U.S. PERCENT DISTRIBUTIONS (1960 CENSUS)

Sex:	
Male 15+	48.5
Female 15+	51.5
Age:	
15-24	19.5
25-34	18.5
35-44	19.5
45-64	29.4
65+	13.1
Years of School Completed (Persons 14 yr and over):	
≤ 8 yr	36.7
9-11 yr	23.4
12 yr	24.5
13-15 yr	8.8
16+ yr	6.5

Age by Sex:	
Male:	
15-24	20.0
25-34	18.6
35-44	19.6
45-64	29.6
65+	12.2
Female:	
15-24	19.0
25-34	18.3
35-44	19.4
45-64	29.3
65+	14.0
Income (Family):	
< $4,000	42.0
$ 4,000-$6,999	29.8
$ 7,000-$9,999	16.2
$10,000-$14,999	8.4
$15,000 and over	3.7

	Years				
	≤ 8	9-11	12	13-15	16+
Years of School Completed by Age:					
14-24 yr	5.4	8.2	5.2	1.9	0.5
24-34 yr	3.5	4.0	6.5	2.0	2.0
35-44 yr	5.1	4.1	6.3	1.8	1.7
45-64 yr	13.8	5.5	5.3	2.3	1.9
65+ yr	8.9	1.5	1.3	0.7	0.5
Years of School Completed by Age and Sex:					
Male:					
14-24 yr	6.2	8.3	4.7	2.1	0.6
25-34 yr	3.8	4.0	5.5	2.1	2.6
35-44 yr	5.5	4.1	5.5	1.9	2.2
45-64 yr	14.6	5.3	4.6	2.1	2.2
65+ yr	8.6	1.2	0.9	0.6	0.5
Female:					
14-24 yr	4.6	8.1	5.7	1.7	0.4
25-34 yr	3.2	4.0	7.5	1.9	1.4
35-44 yr	4.7	4.1	7.4	1.7	1.2
45-64 yr	13.0	5.7	6.0	2.5	1.6
65+ yr	9.2	1.8	1.7	0.8	0.5

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Thanks for your April 10 letter with attached revision of the Sniffmobile questionnaire. We think your changes are all to the good and we offer you only the following comments.

The revised codes for age may indeed be helpful in reducing the tendency of some people to understate their years. We hold no particular brief for the state-of-health question, since it did not seem useful in the previous analysis. The change on education is also good.

To make income breaks more comparable with Census and other data, we would recommend changing the last three categories to 7,000-9,999, 10,000-14,999, and 15,000 or more. The last category in 1967 accounted for 12.2% of families, nation-wide.

We agree with the deletion of the smoking queston and we like your suggestion to replace the code numbers with boxes to be checked. The numbers now serve no functional purpose and possibly confuse respondents.

We like Q. 1 on the back of the questionnaire, especially since you intend to include a zero intensity in some of your tests. We do feel there should be some instructions after this question: for example, IF YES, PLEASE ANSWER QUESTIONS 2, 3, and 4. IF NO, THAT IS ALL WE WANT TO KNOW. THANK YOU VERY MUCH. But perhaps you will want to try it out as it stands. With this question included, it will be important, as you say, for the "Spiel" to make the point that a "No" answer is perfectly acceptable and normal.

It occurs to us that if you expose people to very faint odors or to zero odors, they may not recognize the smell even though they detect some kind of vague odor. Perhaps a "Don't know" or "Not sure" box will be needed in Q. 2.

We like the new Q. 3, though I personally feel that it makes Q. 4 rather redundant, especially if the respondent has just said he would *not* find the odor objectionable. If he answers Yes to 3, I would expect that in the great majority of cases he would answer Yes to 4. However, this again may be worth testing.

Ben took exception to and I was a little puzzled by your statement that "since we are not planning to use any rigorous techniques or defend same on theoretical grounds, it makes little difference whether our sampling is with or without replacement." He notes that, while there are inherent qualifications which must be attached to our sampling method, it should nevertheless be as rigorous as possible since you will use it to generate statistical data which will be treated mathematically. I am sure you are in agreement.

We also feel that effort should be made to keep out "repeaters", either through recognition or by asking each person or group, "Have you ever taken part in this survey before?" If the van is parked at the same downtown location, it is inevitable that some "regulars" who are curious or who have nothing else to do will volunteer repeatedly (if only to collect ball-point pens!) and this just could distort the data somehow. We grant that some few people are bound to take the test more than once, but the project will be easier to defend if we can say that we tried to prevent this.

That sums up our reactions to your changes. We hope they are useful to you and that you will feel free to call us about any future problems or questions.

Letter of 12/16/70 from Paul Sheatsley to Charles T. Hare

Ben King and I have studied your December 1 progress report and have the following observations.

This year's cartoon rating scores from San Antonio are, in the case of odors D-4 and D-6, considerably lower than the scores assigned to those same odors in San Antonio (and elsewhere) last year. The most likely explanation is that the 1969 method of administering the odors in sequence to the same respondents resulted in increased sensitivity to the odor as the test progressed, and thus in higher scores in the higher D levels. It was this possibility which presumably led to the change in design this year to one odor level per respondent, and the results appear to support the hypothesis.

For D-2 the 1970 rating score is considerably higher than that obtained in San Antonio (or anywhere else except Los Angeles) last year. The explanation of this finding is not readily apparent, though it may relate to site selection. D-2 seems to have been tested at Lackland Plaza where the population is described as middle class Caucasian. It appears that this population includes a larger proportion of persons with college education, which we found last year correlates with dislike of the odor. When you weight this sample in accordance with overall population characteristics, the difference may then be reduced or even disappear.

Perhaps the most striking finding is that the cartoon scores continue to be related to the D levels in a linear manner with positive slope, even when they are presented singly rather than in progression. The data thus confirm the major finding of last year that people distinguish among the levels and find the odor more unpleasant as the level increases.

The most serious problem in the 1970 data is the difficulty in interpreting the response to the questions, "Is this odor objectionable?" and "Should this odor be reduced?" Again, with one minor objection, the proportion of persons who say the odor is objectionable and should be reduced increases in a linear manner with each increase in D level. However, the proportions who respond in this manner seem unnaturally high.

Thus, one-third of those exposed to the 0 level found it objectionable and 40% wanted it reduced; among those who said they smelled this odor, the majority gave those answers. You have stated that there was a dusty residual odor in this test which might have produced these responses. At the D-2 level, about 58% found it objectionable and 69% want it reduced; among those who smelled it, the respective percentages were 65 and 78.

These questions were not asked in last year's study, where the most closely related question was "Are any of these odors so bad that someone should take steps to reduce them? IF YES, Which ones?" In San Antonio in 1969 only 23% of the respondents said the D-2 (Test 1) odor was that bad. True, this response was offered after the respondents had been exposed to the higher levels, thus making it seem less unpleasant by comparison. But this can hardly account for the difference between 23% last year who said it was so bad that someone should take steps to reduce it, and the 68% this year who said it should be reduced.

In our view, the two questions asked this year must be interpreted extremely carefully. The responses at the 0 level are indicative. Here, 176 persons said they did not smell anything but 178 said the odor should be reduced. A cross-tab of these items might be more revealing.

It would seem that the two questions in the present study are tapping a much broader domain of opinion than the respondent's actual experience in the Sniffmobile. While people seem to be rating the particular odor they have just been exposed to when they mark their cartoon ratings, the intrusion of questions about odor reduction and objectionability may shift their consideration to broader questions of environmental pollution.

Both questions tell the person he has been exposed to an odor, even if he failed to perceive it. The first asks if it is objectionable, and in these days of publicity about pollution, it is perhaps natural for many people to say

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The most serious problem in the 1970 data is the difficulty in interpreting the response to the questions, "Is this odor objectionable?" and "Should this odor be reduced?" Again, with one minor objection, the proportion of persons who say the odor is objectionable and should be reduced increases in a linear manner with each increase in D level. However, the proportions who respond in this manner seem unnaturally high.

Thus, one-third of those exposed to the 0 level found it objectionable and 40% wanted it reduced; among those who said they smelled this odor, the majority gave those answers. You have stated that there was a dusty residual odor in this test which might have produced these responses. At the D-2 level, about 58% found it objectionable and 69% want it reduced; among those who smelled it, the respective percentages were 65 and 78.

These questions were not asked in last year's study, where the most closely related question was "Are any of these odors so bad that someone should take steps to reduce them? IF YES, Which ones?" In San Antonio in 1969 only 23% of the respondents said the D-2 (Test 1) odor was that bad. True, this response was offered after the respondents had been exposed to the higher levels, thus making it seem less unpleasant by comparison. But this can hardly account for the difference between 23% last year who said it was so bad that someone should take steps to reduce it, and the 68% this year who said it should be reduced.

In our view, the two questions asked this year must be interpreted extremely carefully. The responses at the 0 level are indicative. Here, 176 persons said they did not smell anything but 178 said the odor should be reduced. A cross-tab of these items might be more revealing.

It would seem that the two questions in the present study are tapping a much broader domain of opinion than the respondent's actual experience in the Sniffmobile. While people seem to be rating the particular odor they have just been exposed to when they mark their cartoon ratings, the intrusion of questions about odor reduction and objectionability may shift their consideration to broader questions of environmental pollution.

Both questions tell the person he has been exposed to an odor, even if he failed to perceive it. The first asks if it is objectionable, and in these days of publicity about pollution, it is perhaps natural for many people to say that any odor, unless obviously pleasant, is objectionable. It is interesting that more people say the odor should be reduced than find it objectionable; this is true at every D level. A cross-tab of these two items might be interesting, as well.

Why would people want to reduce an odor they do not find objectionable and, in some cases, cannot even detect? It seems that the question "should this odor be reduced?" is pretty hard to say No to. It may well be true that public opinion is more anti-odor this year than last year, but we feel that last year's question was a better one. "Is the odor *so bad* that *someone should take steps* to reduce it?" suggests that the odor is not just mildly unpleasant but is really so bad that someone, presumably at a certain effort or cost, should take actions against it. Even if administered after a single test of one D level, we believe this question would produce fewer Yes answers than the question, "Should this odor be reduced?"

Please let us know if we can provide any further advice or help.

Letter from Amos Turk to Karl Springer

February 15, 1971

Comments on

Southwest Research Institute
Quarterly Progress Report No. 3 for the period
August 16–November 15, 1970, National Air
Pollution Control Administration Contract No.
CPA 70-44, "Study of Public Response to
Diesel Engine Exhaust Odors."

This study has obviously been well conceived and executed, and provides reasonable measures of how intense a diesel exhaust odor must be to elicit certain responses with regard to recognition, objectionability, and suggestions for control action.

What is particularly interesting is the data summarized in Figure 7, which relates diesel odor intensity as measured by the nominal D-rating) to the objectionability as indicated on the cartoon scale. The most obvious feature is the linearity of the graph. If we arbitrarily connect the points for D-2 and D-6 by a straight line, the equation for that line would be

$$\text{Cartoon response} = 2.1 + 0.27\ D$$

and the other points would fit closely, as shown below:

D rating of odor	Objectionability (Cartoon response)		
	Calc.	Obs.	
0	2.1	2.3	
2	2.6	2.6	(fixed)
3	2.9	2.9	
4	3.2	3.1	
5	3.5	3.4	
6	3.7	3.7	(fixed)

A linear response of this sort is in contrast with the notion that judges will tend to bias their scores toward the center of a scale. If this were true, the cartoon responses at both high and low D-values would curve toward the center of the cartoon scale, and the relationship would not be linear.

However, on first consideration it may seem strange that the relationship between objectionability and intensity (D-value) is not a direct proportionality, that is, when the intensity is zero the objectionability has a positive value. In the first place, in reporting these results, I believe that it is confusing to number the cartoon scale from 1 to 5. It would be much better to use the range of −1 to 3, as follows:

Cartoon	Objectionability number
pleasant	−1
neutral	0
unpleasant	1
very unpleasant	2
unbearable	3

This scale maintains the linearity that SwRI has shown the cartoon sequence adheres to, and sets values of zero for "neutral." The latter assignment is consistent with most of the recent thought in hedonic scaling (for example "Hedonic Appraisals of Environmental Odors" by James W. Johnston, Jr. and Eugene P. Rubacky) Chapter in preparation for the volume on "Human Response to Environmental Odors," Volume 4 of "Advances in Chemoreception").

Of course, with such a scale, the relationship between objectionability and intensity becomes directly proportional:

$$\text{Objectionability} = 0.27\ D$$

D Rating of Odor	Objectionability (Cartoon responses)	
	Calc.	Obs.
0	0	0.3
2	0.54	0.63
3	0.81	0.87
4	1.1	1.1
5	1.4	1.4
6	1.6	1.7

With regard to the nominal D-zero level, however, the fact that most people answered "yes" to the question "Did you smell anything?" is noteworthy. Such an answer cannot be understood in terms of the classical assumption of psychophysics that the sensory system (man's olfaction in this case) has a fixed cutoff or an absolute threshold for stimulation that would elicit a positive response. This theory of a fixed cutoff is now losing support. (T. Engen, "Man's Ability to Perceive Odors" Chapter 12 in ADVANCES IN CHEMORECEPTION, Volume 1, Appleton-Century-Crofts, New York, 1970). In its place a detection theory based on a decision analysis model of psychophysical threshold has been proposed by Green and Swets (Green, D.M. and Swets, J.A., Signal Detection Theory and Psychophysics. New York, Wiley, 1966). In essence, detection theory proposes that there is no fixed cutoff of perception and therefore no stimulus or sensory threshold at all. In its place, the problem of detecting a stimulus may be considered as a problem of signal-to-noise ratio. Whenever an experiment presents a stimulus there will also be some noise because of external uncontrollable events, variability in the stimulus, or spontaneous internal events, such as random actions of the nerve cells. It is assumed that such noise has an effect on the sensory system of the same general quality as the stimulus itself, and that there is therefore no fixed criterion that the observer can apply to his sensation to be able to make a sharp difference between "Yes, I smelled something" versus "No, I did not smell anything." Instead of considering the task as one of categorizing experiences into two classes (detection and lack of detection), the detection theory considers it to be analogous to statistical sampling and deciding whether the response was caused by a particular stimulus or by noise. In other words, there is always a sensory event. The question is therefore not whether the sensory event occurred but whether the sensory event was produced by the stimulus or by the noise. The response of the observer therefore depends on his conception of the situation, that is, on the criterion by which he decides whether he smelled something or not.

Engen has shown that the criterion by which a person decides whether or not an odor is present can be manipulated over wide ranges by such small rewards and punishments as the gain or loss of a few cents. The situation can be visualized as a payoff matrix with four possibilies.

		RESPONSE	
		YES	NO
IS A DIESEL ODOR PRESENTED?	YES	correct	miss
	NO	false alarm	correct

The situation in the "Sniffmobile" test engenders a large expectation that an odor will be present. This factor shifts the decision criterion in the direction of a lower level of stimulation (such as could be produced by random "noise" with no diesel odor present) and a high rate of "false alarm" responses. This result is certainly understandable in terms of detection theory. Also, the hypothesis that the "yes" response to the D-0 stimulus is an expectation phenomenon is supported by the data that show that this odor was experienced less frequently than any of the other levels.

The important point of this aspect of the study is that the cartoon responses averaged close to "neutral" (or zero on the proposed −1 to +3 scale). I believe that this result contributes to the validation of the SwRI study because it means that the typical respondant says, in effect, "All of this elaborate setup must mean that there is really some sort of odor here, and I suppose if this is so that something should be done about it, but I don't actually know what kind of a sensation this is, and it really leaves me neutral."

The recognition of such phenomena is not new. An interesting demonstration was described in 1899 (E.E. Slosson, *Psychological Review,* Volume 6, Page 407, 1899).

> I had prepared a bottle filled with distilled water in cotton and packed in a box. After some other experiments I stated that I wished to see how rapidly an odor would be diffused through the air and requested that as soon as anyone perceived the odor he should raise his hand, I then unpacked the bottle in the front of the hall, poured the water over the cotton, holding my head away during the operation and started a stopwatch. While awaiting results I explained that I was quite sure that no one in the audience had ever smelled the chemical compound which I had poured out, and expressed the hope that, while they might find the odor strong and peculiar, it would not be too disagreeable to anyone. In fifteen seconds most of those in the front row had raised their hands, and in forty seconds the "odor" had spread to the back of the hall, keeping a pretty regular "wave front" as it passed on. About three-fourths of the audience claimed to perceive the smell. . .More would probably have succumbed to the suggestion, but at the end of a minute I was obliged to stop the experiment for some of the front seats were being unpleasantly affected and were about to leave the room. . ."

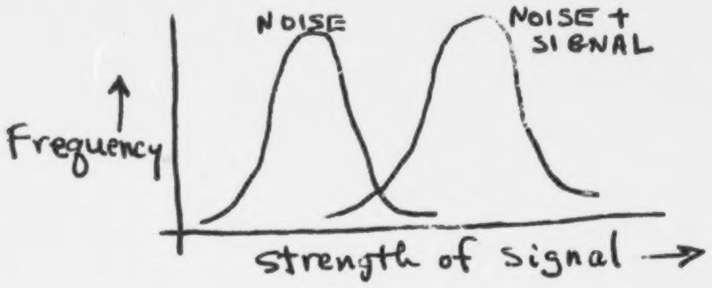
Letter from Amos Turk to Charles Hare and Karl Springer

March 14, 1971

Comments on SwRI Report on NAPCA Contract
No. CPA 70-44, "Study of Public Responses
to Diesel Engine Exhaust Odors."

Question 1: Letter from C.T.H., 3/4/71, top of page 2, "... was the noise effect constant ...?"

Comment: The noise effect consists of signals other than diesel exhaust that could be interpreted as odor. These signals include random neutral firings not related to any odorant, vapors in the nasal area emanating from the body itself or its associated microorganisms, and nondiesel vapor that might have passed through the purification system or been introduced later (as by desorption) and that appears in the air stream presented to the judges. None of these is apt to change significantly when diesel odor is introduced. Therefore, it seems reasonable to consider the noise as simply being added to the system.



Question 2: (same letter, Fig. X) "Can D-zero values be subtracted from curves B and C?"

Comment: The objectionability is a roughly linear function of the D-rating over the range from D-0 to D-6 (Progress Report 3, Fig. 7). Mathematically, it would therefore appear to be correct to assume that the objectionability at, say, D-4, is the sum of two components, which are the objectionability due to noise and that due to diesel exhaust. The objectionability due to the diesel exhaust alone would then be the difference between the D-4 value and the D-0 value. Since the fraction of participants who wanted the odor reduced is also approximately linear in the range D-0 to D-4 (Figure X) we could say that in this range the subtraction would be valid. However, the problem is that there is no such thing as exposure to diesel exhaust alone without noise, and such a subtraction, even if mathematically valid, would not correspond to any reality. In fact, the odor "noise" on the street or highway might well be greater. Therefore, I consider the subtraction to be unwarranted.

Question 3: Can we treat the near-zero data as a separate case?

Comment: I would find no objection to such a separation. There are two justifications for this recommendation. One is the conceptual distinction between the pure "noise" distribution and the actual distribution of combined signal + noise as shown on the previous page. The second is the graph accompanying your letter of March 4 showing D-score versus fraction of participants who perceived odor. (The left part of this curve is cut off in your final report.) The nominal D-0 score was 52% for "occasionally," and much lower for the "oftens" or "never." "Occasionally" is a non-committal answer, especially at low intensity levels, and far different from "often" or "never" which are both much more definite. This implies a real quality difference between D-0 and, say, D-2, where "occasionally" and the "oftens" converge.

Question 4: What is the significance of the answers to questions 3 and 4 of the questionnaire, as discussed in your final report?

Comment: There is an alternate interpretation other than "I don't find the odor objectionable myself, but perhaps others would . . ." The participants may have been saying, "I don't find the odor objectionable, but it may be harmful, or associated with something harmful, so it had better be reduced." It is interesting that this phenomenon ("no" to Question 3 and "yes" to Question 4) is most marked at the *lowest* real D-level, D-2. This fact reinforces the idea that there is a component of expectation in the responses to low levels of diesel exhaust. This Question 3-4 "inversion" is also very marked, of course, when there is no diesel odor at all, as shown by the D-0 data.

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APPENDIX B

DIRECTIONS TO PARTICIPANTS

We thank you very much for coming in. This survey is to find out your opinion of a common odor, typical of cities in the United States, and it is being conducted by Southwest Research Institute for the U.S. Department of Health, Education, and Welfare.

During the few minutes you will spend here, you will be asked to take a sniff of one odor sample. The odor has no health hazard, and your participation must be completely voluntary. I want to make clear that this is a common odor, and that it is not dangerous, but if any of you have reservations about sniffing it, I would appreciate your telling me so now.

I will hand each of you a questionnaire in just a moment which should be filled out before the odor testing begins. For each question, check the box beside the answer which fits you best. All the information you give will be kept confidential, and you will not be identified. We do not want your name on the questionnaire. Use the ball point pen which has been provided to fill out the sheet, and if you have any questions, please do not hesitate to ask them. (pass out questionnaires) On question number 4, check "employed" only if you work 35 hours per week or more. On question number 6, check the total income of the household where you live, not just your personal income. (allow time to complete questions, check over answers).

If you have not already done so, please turn the questionnaire over now, and we will examine the other side. In a few minutes an odor will be presented through the cone in each booth. In order for you to evaluate the odor properly, it is important that you rotate the hood out of the way (demonstrate), put your nose well down into the cone when you sniff (demonstrate), and then return the hood to its original position (demonstrate). There is no odor in the cone now, so practice it once to see how it works (observe and coach where necessary).

Very good. Now, when the odor sample is ready for you to evaluate, I'll tell you so. Please take just one or two sniffs, and answer question 1 immediately. Some of you may not be able to smell this odor, so if you don't smell anything, please answer "no" to question 1 and stop there. If you do smell somthing, answer "yes" to question 1 and then check the box under the cartoon character which best expresses your feeling about the odor. Each cartoon character is reacting to an odor he is experiencing, and we want you to check only one box. If you answered "yes" to question 1 and checked a box under one of the cartoons, please answer questions 2, 3, and 4. Are there any questions?

I will start the odor system now, but please do not sniff until I tell you to. It will be about a minute before the odor is ready (go to condition).

(When system has stabilized–about 30 sec.) Please take a sniff of the odor in the cone at this time and record your opinion as I explained earlier (keep odor on for about 30 seconds).

(When everybody seems to be about finished.) Thank you very much for helping us with our survey. Please keep the ball point pen you have been using as a souvenir.

APPENDIX C

CALIBRATION DATA

CALIBRATION DATA

	Site 01 (9/22)							
"D"	4.00	3.9	4.1	3.5	3.5	3.8	3.7	3.8
"B"	1.11	1.2	1.0	1.0	0.8	1.1	1.1	1.1
"O"	0.89	1.0	1.1	0.9	0.9	1.1	1.0	1.1
"A"	0.89	0.9	1.0	1.0	0.9	1.0	0.9	1.0
"P"	0.89	0.7	0.9	0.6	0.7	0.7	0.9	0.6

	Site 01 (9/30)							
"D"	3.8	4.1	3.5	4.2				
"B"	1.0	1.5	1.1	1.3				
"O"	1.0	1.1	1.0	1.1				
"A"	1.0	0.8	1.0	0.9				
"P"	0.6	0.8	0.5	1.0				

	Site 02 (10/5)							
"D"	5.33	5.00	4.89	4.78	4.89	4.11	5.44	4.89
"B"	1.89	1.78	1.78	1.56	1.78	1.11	1.89	1.44
"O"	1.44	1.11	1.11	1.22	1.22	1.11	1.56	1.11
"A"	0.89	1.00	1.00	1.00	1.00	1.00	1.00	1.00
"P"	1.00	1.11	1.00	1.00	1.00	0.89	1.00	1.00

	Site 02 (10/15)							
"D"	4.5	5.4	4.5	5.1				
"B"	1.4	1.7	1.5	1.7				
"O"	1.2	1.4	1.0	1.2				
"A"	1.0	0.9	1.0	1.0				
"P"	0.8	1.1	0.9	1.2				

	Site 03 (10/20)							
"D"	5.33	5.00	5.9	5.6	5.8	5.8	6.0	
"B"	1.89	1.67	2.0	1.9	1.9	1.9	1.9	
"O"	1.11	1.11	1.5	1.4	1.4	1.5	1.6	
"A"	1.22	1.00	1.2	1.1	1.0	1.2	1.1	
"P"	1.00	1.00	1.0	1.0	1.2	1.1	1.1	

	Site 03 (10/26)							
"D"	6.2	5.9	6.1	6.3				
"B"	2.0	2.0	1.9	1.8				
"O"	1.4	1.5	1.6	1.5				
"A"	1.1	1.2	1.1	1.2				
"P"	1.1	1.0	1.1	1.1				

	Site 04 (10/27)							
"D"	2.8	2.8	3.1	3.7	3.5	3.2	3.2	2.8
"B"	0.8	1.0	1.0	1.0	1.1	1.0	1.1	1.0
"O"	1.0	1.0	0.7	1.0	1.0	1.0	1.0	0.9
"A"	0.8	0.7	0.9	1.0	0.9	0.8	0.7	0.7
"P"	0.2	0.1	0.4	0.7	0.4	0.3	0.4	0.4

	Site 04 (11/2)							
“D”	3.33	3.22	3.33	3.00	3.11			
“B”	1.11	1.00	1.00	1.00	0.89			
“O”	0.89	0.89	1.00	1.00	0.78			
“A”	0.89	0.89	0.89	0.56	0.78			
“P”	0.44	0.44	0.44	0.33	0.44			

	Site 05 (11/3)							
“D”	2.44	1.56	2.44	1.33	2.33	1.33	2.44	1.89
“B”	1.00	1.00	1.00	0.78	1.00	0.89	1.00	1.00
“O”	0.89	0.22	1.00	0.44	0.89	0.44	0.78	0.56
“A”	0.44	0.33	0.33	0.11	0.33	0.00	0.67	0.33
“P”	0.11	0.00	0.11	0.00	0.00	0.00	0.00	0.00
“D”	2.33	2.56	1.67	2.00	2.00	1.67	2.22	1.78
“B”	1.00	1.00	1.00	0.89	1.00	0.89	1.00	1.00
“O”	0.89	0.89	0.44	0.44	0.67	0.78	0.56	0.56
“A”	0.44	0.56	0.22	0.33	0.33	0.33	0.11	0.22
“P”	0.00	0.11	0.11	0.22	0.00	0.11	0.00	0.11

	Site 05 (11/6)							
“D”	2.50	1.75	1.50	1.75	2.50			
“B”	1.00	1.00	0.88	0.88	1.00			
“O”	0.75	0.62	0.62	0.50	0.88			
“A”	0.38	0.38	0.25	0.50	0.62			
“P”	0.12	0.00	0.00	0.00	0.12			

	Site 06 (11/10)							
“D”	0.8	0.6	1.0	0.4	0.6	0.8	0.6	0.7
“B”	0.5	0.4	0.7	0.3	0.4	0.1	0.0	0.5
“O”	0.1	0.2	0.4	0.1	0.2	0.1	0.4	0.1
“A”	0.2	0.0	0.2	0.0	0.0	0.4	0.0	0.0
“P”	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
“D”	1.1	0.36	0.00	0.00	0.36	0.09	0.00	
“B”	0.5	0.18	0.00	0.00	0.09	0.00	0.00	
“O”	0.2	0.09	0.00	0.00	0.00	0.00	0.00	
“A”	0.3	0.09	0.00	0.00	0.18	0.09	0.00	
“P”	0.0	0.00	0.00	0.00	0.00	0.00	0.00	

	Site 06 (11/16)							
“D”	0.25	0.00	0.00	0.00	0.00	0.00		
“B”	0.00	0.00	0.00	0.00	0.00	0.00		
“O”	0.00	0.00	0.00	0.00	0.00	0.00		
“A”	0.12	0.00	0.00	0.00	0.00	0.00		
“P”	0.00	0.00	0.00	0.00	0.00	0.00		

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APPENDIX D

FIELD STUDY DATA

The coding system used on these data is as follows:

Columns	Value	Interpretation
1 and 2	01 to 06	test site number
3, 4, and 5	001 to 999	questionnaire number
7	1 or 2	male or female
9	1 to 5	lst to 5th age level
11	1 to 5	lst to 5th education level
13	1 to 5	lst to 5th activity level
15	1 to 4	1st to 4th employment level
17	1 to 5	1st to 5th income level
19	1 or 2	did or did not perceive odor
21	1 to 5	odor rating in terms of cartoon number
23	1 to 4	1st to 4th level of experience of odor
25	1 to 3	location of odor; indoors, outdoors, or both
27	1 or 2	odor was or was not objectionable
29	1 or 2	odor should or should not be reduced

conditions: column 15 blank if column 12 not 1
column 21-29 blank if column 19 not 1
column 25 blank if column 23 is 4

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
01	001	1	2	5	1	1	3	1	2	2	2	2	2
01	002	2	4	3	1	4	4	1	2	1	1	1	1
01	003	1	1	3	1	3	2	1	4	4	2	1	1
01	004	2	4	3	1	2	3	1	3	1	2	1	1
01	005	2	5	1	2		1	1	3	1	2	1	1
01	006	1	5	1	5		1	1	3	1	2	1	1
01	007	1	3	1	1	1	3	1	4	4	2	1	1
01	008	1	2	5	1	1	2	1	2	3	2	2	1
01	009	1	2	2	1	3	1	1	3	1	2	1	1
01	010	2	1	4	5		4	1	2	2	2	2	2
01	011	2	2	5	1	1	3	1	4	3	2	1	1
01	012	1	2	5	1	1	4	1	3	2	2	1	1
01	013	2	1	2	5		1	1	3	1	2	1	1
01	014	2	1	2	5		1	1	3	1	2	1	1
01	015	1	2	3	1	2	2	1	4	1	2	1	1
01	016	2	4	4	1	1	3	1	3	1	2	1	1
01	017	2	3	2	7		2	1	3	1	2	1	1
01	018	2	2	3	1	2	1	1	3	4	2	2	1
01	019	1	3	3	1	3	3	1	2	1	2	1	1
01	020	1	4	5	5		5	1	3	1	2	1	1
01	021	1	4	2	1	3	2	1	3	2	3	1	1
01	022	1	4	1	1	2	2	1	3	1	2	1	1
01	023	1	2	5	1	1	4	1	2	2	2	1	1
01	024	1	2	4	1	2	4	1	3	1	2	1	1
01	025	1	3	5	1	2	3	1	4	2	2	1	1
01	026	1	2	5	1	2	2	1	4	1	2	1	1
01	027	1	3	2	1	1	2	1	3	1	2	1	1
01	028	1	5	1	1	4	2	1	5	1	3	1	1
01	029	2	2	4	1	2	2	1	4	2	2	1	1
01	030	1	3	2	1	1	4	1	3	1	2	1	1
01	031	1	4	1	4		1	1	5	1	2	1	1
01	032	2	1	3	5		1	1	2	2	2	1	1
01	033	2	2	2	1	4	1	1	3	2	2	1	2
01	034	2	1	3	1	2	2	1	4	2	2	1	1
01	035	2	1	5	1	2	1	1	3	3	2	1	1
01	036	1	4	3	4		3	1	3	1	1	1	1
01	037	1	3	5	1	4	5	1	3	1	3	1	1
01	038	2	2	4	1	2	1	1	3	1	2	1	1
01	039	1	4	2	1	3	3	1	3	2	2	1	1
01	040	2	1	2	2		2	1	2	2	2	2	2
01	041	1	2	2	1	4	1	1	4	1	2	2	2
01	042	1	2	5	1	1	4	1	3	3	2	2	1
01	043	1	2	2	5		1	1	3	3	3	1	1
01	044	2	3	4	1	2	2	1	4	3	2	1	1
01	045	1	1	2	4		1	1	1	4	3	1	2
01	046	1	4	1	1	4	2	1	4	1	2	1	1
01	047	1	3	5	1	1	3	1	3	2	2	1	1
01	048	1	1	4	1	3	2	1	3	3	2	1	1
01	049	1	1	4	1	2	2	1	3	3	2	2	1
01	050	1	4	3	1	2	2	1	4	2	2	1	1
01	051	1	4	2	1	3	4	1	3	3	2	1	1
01	052	1	4	2	1	3	2	1	2	4	2	2	2
01	053	1	2	3	1	1	4	1	3	2	2	1	1
01	054	2	1	4	1	2	2	1	3	3	1	1	1
01	055	2	1	3	1	2	2	1	4	3	1	1	1
01	056	2	1	3	1	2	4	1	2	1	1	1	2
01	057	1	5	2	4		2	1	2	2	2	2	2
01	058	1	1	4	1	2	3	1	3	1	2	1	1
01	059	1	5	4	1	1	5	1	3	3	2	1	1
01	060	1	4	5	1	1	5	1	3	1	2	1	1
01	061	1	4	5	1	1	5	1	4	2	2	1	1
01	062	2	1	5	1	2	2	1	3	1	2	1	1
01	063	1	3	4	1	2	3	1	4	2	2	1	1
01	064	1	1	4	1	4	1	1	3	1	2	1	1
01	065	1	5	2	4		1	1	2	3	2	1	1
01	066	1	4	1	1	3	1	1	3	4	2	1	1
01	067	1	1	3	5		1	1	1	3	1	2	1
01	068	2	5	1	4		1	1	2	4	2	2	2
01	069	2	4	1	2		1	1	1	4	1	2	2
01	070	2	5	2	2		5	1	3	2	2	1	1
01	071	1	5	4	1	1	5	1	3	1	2	1	1
01	072	1	2	5	1	1	5	1	5	2	2	1	1
01	073	2	2	2	2		2	1	3	3	2	2	1
01	074	1	3	2	1	3	2	1	3	3	3	1	2
01	075	2	3	3	2		5	1	3	1	2	2	1
01	076	2	1	3	1	2	2	1	3	3	2	2	1
01	077	2	1	3	1	2	1	1	2	1	2	2	1
01	078	2	1	3	1	2	3	1	2	1	2	1	1
01	079	2	1	4	1	2	3	1	4	1	2	1	1
01	080	2	1	4	1	2	2	1	3	1	2	1	1
01	081	2	2	5	2		4	1	4	2	2	1	1
01	082	1	4	1	4		1	1	4	1	2	1	1
01	083	1	1	3	5		2	1	2	1	2	1	1
01	084	1	1	4	3		2	1	2	1	2	1	1
01	085	1	2	2	1	3	1	1	3	2	2	1	2
01	086	1	3	5	1	1	3	1	4	2	2	1	1
01	087	1	5	2	1	1	2	1	5	1	2	1	1
01	088	1	2	4	1	3	3	1	2	3	3	1	1
01	089	2	1	2	2		2	1	3	1	3	1	1
01	090	1	3	2	1	3	2	1	5	1	2	1	1
01	091	1	3	1	1	3	2	1	3	1	2	1	1
01	092	2	1	2	1	3	3	1	2	1	3	1	1
01	093	2	1	3	1	3	2	1	2	3	2	1	1
01	094	2	1	5	3		5	1	3	1	2	1	1
01	095	2	1	5	3		5	1	4	1	2	1	1
01	096	2	1	5	3		5	1	4	1	2	1	1
01	097	1	1	1	1	3	1	1	1	1	1	2	1
01	098	1	1	1	1	3	1	1	1	1	1	2	1
01	099	2	1	1	2		1	1	1	1	2	2	1
01	100	1	3	2	1	1	3	1	4	3	2	1	1
01	101	1	4	2	1	3	2	1	2	3	1	2	1
01	102	1	2	4	1	1	5	1	3	1	2	1	1
01	103	1	2	5	1	1	4	1	3	2	2	1	1
01	104	1	1	2	1	3	1	1	3	3	2	1	1
01	105	2	1	3	3		2	1	3	3	2	1	1
01	106	1	1	3	1	3	4	1	3	1	2	1	1
01	107	1	3	5	1	1	4	1	2	1	3	2	1
01	108	2	1	3	1	2	3	1	3	1	2	1	1
01	109	2	5	1	2		2	2					

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
01	110	2	4	1	4		2	1	3	1	2	1	1
01	111	1	3	5	1	1	5	1	3	1	2	1	1
01	112	1	3	5	1	1	5	1	4	3	2	1	1
01	113	1	3	1	5		1	2					
01	114	1	4	5	1	1	5	1	4	1	2	1	1
01	115	1	4	5	1	2	4	1	3	1	2	1	1
01	116	1	2	2	1	3	1	1	2	1	2	1	1
01	117	1	1	4	1	3	1	1	3	2	2	1	1
01	118	2	2	5	1	2	2	1	4	1	2	1	1
01	119	2	1	1	1	3	1	1	3	2	2	1	1
01	120	2	4	1	2		1	1	3	1	2	1	1
01	121	1	4	1	1	3	1	1	2	3	2	2	2
01	122	1	2	1	1	3	1	1	5	3	3	1	1
01	123	2	5	1	5		1	1	1	4		2	2
01	124	1	1	4	1	2	1	1	3	1	3	1	1
01	125	1	2	5	1	1	4	1	3	1	2	1	1
01	126	1	3	1	2		1	1	3	2	2	1	1
01	127	1	4	2	5		1	1	3	4		1	1
01	128	1	4	1	5		1	1	3	4		1	1
01	129	1	5	3	4		1	1	2	3	3	2	2
01	130	1	1	2	1	4	1	1	3	1	2	1	1
01	131	2	1	3	1	4	1	1	3	1	2	1	1
01	132	2	3	4	1	2	4	1	2	2	2	2	1
01	133	1	4	4	1	1	4	1	3	1	3	1	1
01	134	1	2	5	1	1	4	1	3	2	2	1	1
01	135	1	5	4	4		2	1	2	3	2	1	1
01	136	1	2	5	1	1	4	1	3	4		2	2
01	137	1	4	3	1	1	5	1	2	1	2	1	1
01	138	2	2	1	2		1	1	3	4		2	2
01	139	1	3	2	2		1	1	1	2	1	2	2
01	140	1	5	1	4		1	1	3	1	2	2	1
01	141	1	2	3	5		1	1	3	1	3	1	1
01	142	2	1	2	1	4	1	1	3	3	3	1	1
01	143	2	1	4	1	1	2	1	4	3	2	1	1
01	144	2	4	3	1	1	2	2					
01	145	1	4	3	1	3	3	1	2	3	2	2	1
01	146	2	4	2	2		1	2					
01	147	1	1	1	1	4	2	1	4	2	3	1	1
01	148	2	1	1	2		1	1	4	2	3	1	1
01	149	2	1	1	4		1	1	4	2	3	1	1
01	150	2	1	1	3		1	1	4	2	3	1	1
01	151	2	3	1	2		2	1	1	3	2	2	1
01	152	2	4	1	2		1	1	5	2	1	1	2
01	153	1	5	1	4		1	1	2	3	2	1	1
01	154	1	4	4	1	1	5	1	4	1	2	1	1
01	155	1	2	5	1	1	4	1	4	1	2	1	1
01	156	1	2	5	1	1	5	1	4	1	2	1	1
01	157	1	4	3	4		3	1	3	3	2	1	1
01	158	1	4	2	1	5	1	1	3	2	2	1	1
01	159	1	2	3	1	1	2	1	4	1	2	1	1
01	160	2	1	3	1	2	3	1	4	1	3	1	1
01	161	2	2	5	1	1	2	1	4	3	2	1	1
01	162	2	2	3	1	2	2	1	3	2	2	1	1
01	163	2	1	4	1	2	2	1	3	1	2	1	1
01	164	1	5	4	4		2	1	3	2	2	1	1
01	165	1	2	5	1	1	4	1	3	2	2	1	1
01	166	1	5	1	4		1	1	1	4		1	1
01	167	2	3	5	1	2	2	1	3	2	2	1	1
01	168	2	2	5	2		4	1	3	2	2	2	1
01	169	1	3	1	1	3	2	1	3	1	2	1	1
01	170	1	4	4	5		1	1	3	1	3	1	1
01	171	1	4	3	4		2	1	3	3	1	1	1
01	172	1	1	2	1	4	1	1	3	3	2	1	1
01	173	1	4	5	1	1	5	1	3	2	2	1	1
01	174	1	2	5	1	1	2	1	3	1	2	1	1
01	175	2	2	3	1	2	2	1	4	2	2	1	1
01	176	2	2	3	1	2	1	1	5	1	2	1	1
01	177	1	4	4	1	1	4	1	4	1	3	1	1
01	178	1	2	5	1	1	4	1	3	3	2	1	1
01	179	1	2	5	1	1	4	1	3	3	2	1	1
01	180	1	2	5	1	1	5	1	3	2	2	1	1
01	181	2	1	4	1	2	3	1	2	2	2	1	1
01	182	2	5	1	4		1	1	3	3	2	1	1
01	183	2	1	4	1	2	5	1	3	1	2	1	1
01	184	1	4	1	1	3	4	1	3	1	2	1	1
01	185	1	4	3	1	3	4	1	3	4		1	1
01	186	2	2	3	1	1	3	1	4	1	2	1	1
01	187	2	2	3	1	2	3	1	4	1	2	1	1
01	188	2	3	4	1	2	3	1	4	2	2	1	1
01	189	2	3	3	1	2	1	1	2	3	3	2	1
01	190	1	3	1	1	3	1	1	3	2	2	1	1
01	191	1	4	1	1	3	1	1	3	1	3	1	1
01	192	1	3	1	5		1	1	3	1	2	1	1
01	193	2	3	3	1	2	3	1	3	3	2	1	1
01	194	2	2	3	1	2	2	1	4	1	1	1	1
01	195	2	2	2	1	2	2	1	4	1	2	1	1
01	196	2	4	2	1	3	4	1	2	1	2	1	1
01	197	2	2	1	2		5	1	3	1	2	1	1
01	198	1	2	5	1	1	5	1	3	1	2	1	1
01	199	1	3	2	5		1	1	2	1	2	1	1
01	200	2	2	5	1	3	3	1	3	2	3	1	1
01	201	1	4	4	1	2	3	1	3	1	2	1	1
01	202	1	1	4	1	1	2	1	3	3	2	1	1
01	203	2	3	1	1	3	1	1	1	4		1	1
01	204	2	4	4	1	2	4	1	3	2	2	1	1
01	205	2	3	4	1	2	4	1	3	1	3	1	1
01	206	1	3	5	1	1	5	1	3	2	2	1	1
01	207	1	2	5	1	1	5	1	3	2	2	1	1
01	208	1	2	5	1	1	4	1	3	1	2	1	1
01	209	1	2	5	1	1	4	1	3	1	2	1	1
01	210	2	5	5	4		1	2					
01	211	2	4	2	1	2	4	1	2	2	2	2	2
01	212	2	3	4	1	1	5	1	3	2	2	1	1
01	213	1	4	5	1	2	3	1	4	1	2	1	1
01	214	1	4	4	1	1	4	1	3	1	2	1	1
01	215	1	1	1	1	4	1	1	4	1	2	1	1
01	216	1	3	4	1	3	2	1	3	1	2	1	1
01	217	1	3	5	1	1	4	1	2	1	2	2	1
01	218	1	3	5	1	1	5	1	3	1	2	1	1
01	219	1	3	1	1	2	1	1	3	3	1	1	1

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
01	220	1	4	2	4		1	1	2	2	1	1	1
01	221	2	3	4	2		1	1	5	3	1	1	1
01	222	1	3	4	1	2	4	1	4	1	2	1	1
01	223	1	2	3	1	3	3	1	3	1	3	1	1
01	224	2	3	3	3		4	1	3	1	2	1	1
01	225	1	3	4	1	3	3	1	3	1	2	1	1
01	226	2	4	4	1	2	1	1	4	1	2	1	1
01	227	1	4	5	1	1	5	1	3	3	2	1	1
01	228	1	2	3	1	2	2	1	2	4		1	1
01	229	2	1	4	3		1	1	3	3	3	1	1
01	230	2	1	4	1	2	3	1	4	2	2	1	1
01	231	2	1	4	1	2	2	1	3	2	2	1	1
01	232	1	2	3	4		3	1	5	1	1	1	1
01	233	1	1	2	1	2	2	1	5	2	3	2	1
01	234	1	2	4	1	3	2	1	5	2	2	1	1
01	235	1	1	3	1	4	2	1	5	3	2	1	1
01	236	2	2	2	1	2	1	1	2	3	2	2	1
01	237	1	2	2	4		1	1	2	3	2	1	2
01	238	2	1	4	1	2	2	1	2	1	2	1	2
01	239	2	2	2	1	2	2	1	3	2	3	1	1
01	240	2	1	3	1	2	1	1	4	2	2	1	1
01	241	2	1	4	1	2	3	1	2	4		1	1
01	242	2	3	3	1	1	3	1	3	2	2	1	1
01	243	1	1	4	1	1	3	1	3	1	2	1	1
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01	245	1	1	4	1	4	2	1	2	3	2	2	1
01	246	2	1	2	1	1	2	1	3	3	1	1	1
01	247	1	3	2	1	4	2	1	3	2	3	1	1
01	248	1	2	5	1	2	5	1	4	1	2	1	1
01	249	2	3	2	1	2	2	1	4	1	2	1	1
01	250	1	4	5	1	1	4	1	3	2	2	1	1
01	251	2	3	4	1	2	4	1	4	1	2	1	1
01	252	2	1	4	1	2	3	1	3	1	2	1	1
01	253	2	4	2	5		1	1	3	3	2	1	1
01	254	1	1	2	1	3	4	1	3	1	2	1	1
01	255	1	1	4	1	3	2	1	3	1	2	1	1
01	256	2	1	2	3		2	1	3	1	2	1	1
01	257	1	1	2	3		2	1	1	1	3	2	1
01	258	1	1	3	3		3	1	2	1	2	2	2
01	259	1	2	3	1	1	1	1	3	1	2	1	1
01	260	2	2	3	1	2	4	1	3	1	2	1	1
01	261	2	1	3	1	2	3	1	3	2	2	1	1
01	262	2	3	3	1	2	4	1	4	1	2	1	1
01	263	2	2	4	1	2	4	1	5	2	2	1	1
01	264	1	1	5	1	2	4	1	4	1	2	1	1
01	265	2	1	4	1	2	3	1	3	3	2	2	1
01	266	2	1	4	1	2	3	1	3	1	2	1	1
01	267	2	1	3	1	2	2	1	4	1	2	1	1
01	268	2	1	3	1	2	1	1	3	3	2	1	1
01	269	1	3	2	2		2	1	3	1	2	1	1
01	270	1	3	5	1	1	3	1	3	2	2	1	1
01	271	1	4	1	1	3	1	1	3	1	2	1	1
01	272	1	5	5	4		2	1	3	1	2	1	1
01	273	1	4	2	1	1	2	1	2	3	3	1	1
01	274	1	4	3	1	3	3	1	3	2	2	1	1

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
01	275	1	4	1	5		1	1	2	4		2	2
01	276	2	1	3	1	2	1	1	4	1	2	1	1
01	277	2	1	3	1	2	1	1	4	1	2	1	1
01	278	2	2	2	1	2	1	1	4	1	2	1	1
01	279	1	3	3	1	3	4	1	5	1	2	1	1
01	280	2	5	2	4		1	1	3	2	2	1	1
01	281	1	5	1	4		1	2					
01	282	1	5	1	4		1	1	2	3	2	1	2
01	283	2	1	3	3		1	1	3	4		1	1
01	284	2	1	4	3		3	1	2	1	2	1	1
01	285	1	2	5	1	1	2	1	3	2	2	1	1
01	286	1	2	5	1	1	5	1	4	1	2	1	1
01	287	2	5	4	5		1	1	3	3	2	1	1
01	288	2	1	2	3		2	1	4	1	2	1	1
01	289	2	1	2	3		2	1	3	1	2	2	1
01	290	2	1	2	3		2	1	2	2	2	2	1
01	291	2	1	2	3		3	1	2	1	2	2	1
01	292	2	1	2	3		2	1	3	1	2	2	1
01	293	1	5	1	4		1	1	3	3	2	1	1
01	294	1	2	1	1	3	1	1	2	3	1	1	1
01	295	1	4	1	1	3	1	1	2	3	1	1	1
01	296	1	3	5	1	1	4	1	2	2	2	2	2
01	297	1	1	4	1	3	1	1	3	1	2	2	1
01	298	2	3	2	2		3	1	4	2	2	1	1
01	299	1	2	4	1	2	3	1	5	1	2	1	1
01	300	2	2	4	1	2	2	1	4	1	2	1	1
01	301	2	2	3	1	2	4	1	4	1	2	1	1
01	302	2	1	4	1	2	2	1	3	2	2	1	1
01	303	1	1	3	5		3	1	3	1	2	1	1
01	304	1	4	1	1	3	3	1	3	3	2	1	1
01	305	1	2	5	1	1	3	1	2	3	1	2	2
01	306	1	2	5	1	1	4	1	3	2	2	1	1
01	307	1	4	1	5		1	1	5	4		1	1
01	308	2	1	3	3		1	1	2	2	2	2	1
01	309	2	1	3	3		3	1	3	1	2	2	2
01	310	2	4	4	5		2	1	3	3	3	1	1
01	311	2	1	4	1	2	1	1	3	1	2	1	1
01	312	1	2	5	1	1	4	1	4	2	2	1	1
01	313	1	2	5	1	2	1	1	4	2	3	1	1
01	314	1	4	4	1	4	3	1	4	1	2	1	1
01	315	1	2	4	1	3	2	1	2	1	2	2	1
01	316	1	4	4	1	1	4	1	4	3	2	1	1
01	317	1	5	1	4		1	2					
01	318	2	1	2	1	3	1	1	5	4		2	1
01	319	2	1	4	1	3	1	1	2	2	1	2	1
01	320	2	1	4	1	2	2	1	3	2	3	1	1
01	321	2	1	4	1	2	2	1	3	3	2	1	1
01	322	2	1	4	1	2	2	1	4	2	2	1	1
01	323	2	1	3	1	2	1	1	5	2	2	1	1
01	324	1	3	1	5		1	1	3	1	3	1	1

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
02	001	1	2	4	1	1	3	1	3	1	2	1	1
02	002	2	5	4	4		2	1	4	1	2	1	1
02	003	1	4	5	1	2	4	1	4	2	2	1	1
02	004	1	5	4	4		2	1	3	2	2	1	1
02	005	2	5	1	2		1	1	5	3	2	2	1
02	006	2	4	3	2		4	1	3	2	2	1	1
02	007	2	4	4	2		5	1	2	3	2	2	2
02	008	2	1	3	2		4	1	2	1	2	2	1
02	009	2	2	4	2		5	1	2	1	2	2	2
02	010	2	2	4	2		4	1	4	2	3	1	1
02	011	2	4	3	2		5	1	4	1	2	1	1
02	012	2	3	4	2		4	1	3	2	2	1	1
02	013	1	3	5	1	1	4	1	4	3	2	1	1
02	014	2	4	3	2		3	1	4	3	2	1	1
02	015	2	1	2	2		1	1	3	1	2	1	1
02	016	2	4	4	2		3	1	3	2	2	1	1
02	017	2	1	4	2		3	1	5	2	3	1	1
02	018	2	1	4	1	2	4	1	4	1	2	1	1
02	019	2	2	3	1	2	2	1	2	2	2	1	1
02	020	1	1	4	1	1	2	1	3	1	2	1	1
02	021	2	1	3	1	2	2	1	4	1	2	1	1
02	022	2	2	3	1	1	3	1	4	3	2	1	1
02	023	1	2	3	1	3	3	1	5	3	3	1	1
02	024	2	5	5	2		1	1	3	1	2	1	1
02	025	2	5	4	2		1	1	3	2	2	1	1
02	026	1	2	5	1	1	3	1	3	3	2	1	1
02	027	2	4	3	1	2	2	1	4	1	2	1	2
02	028	1	3	5	1	1	4	1	3	2	2	1	1
02	029	1	2	5	1	2	2	1	4	2	2	1	1
02	030	1	3	5	1	1	5	1	4	1	2	1	1
02	031	1	2	5	1	1	3	1	5	2	2	2	2
02	032	2	2	4	1	1	3	1	4	1	2	1	1
02	033	1	2	4	1	1	3	1	4	2	2	1	1
02	034	1	1	2	1	3	1	1	2	4		2	2
02	035	1	4	1	1	3	1	1	2	3	2	1	1
02	036	1	4	5	1	1	4	1	4	1	2	1	1
02	037	1	5	5	4		3	1	3	3	1	1	1
02	038	1	1	4	1	1	3	1	5	1	2	1	1
02	039	1	1	4	1	1	3	1	4	1	3	1	1
02	040	1	2	4	1	1	4	1	3	3	2	1	1
02	041	2	1	4	1	1	3	1	4	2	2	1	1
02	042	1	1	4	1	2	3	1	3	1	3	1	1
02	043	2	4	5	2		4	1	5	1	2	1	1
02	044	2	1	4	1	2	5	1	4	2	2	1	1
02	045	2	2	3	1	2	1	1	3	3	2	1	1
02	046	1	1	4	3		1	1	4	2	2	1	1
02	047	2	3	2	2		4	1	3	2	2	1	1
02	048	1	1	2	1	2	3	1	4	1	2	1	1
02	049	2	1	2	3		5	1	2	2	2	1	1
02	050	2	5	1	4		1	1	3	1	2	1	1
02	051	2	4	2	4		1	1	3	4		1	1
02	052	2	2	2	2		3	1	3	2	2	1	1
02	053	1	5	2	4		1	1	3	4		1	1
02	054	2	2	4	2		4	1	3	3	2	1	1
02	055	2	2	5	2		4	1	3	2	2	2	1
02	056	2	4	3	2		4	1	4	1	2	1	1
02	057	2	4	4	2		2	1	3	3	2	1	1
02	058	1	4	3	1	3	4	1	4	1	2	1	1
02	059	2	4	4	2		3	1	2	3	2	2	2
02	060	2	2	3	2		3	1	3	3	2	1	1
02	061	2	2	3	2		1	1	4	3	2	1	1
02	062	2	2	4	2		4	1	4	1	2	1	1
02	063	1	4	4	4		1	1	3	1	2	1	1
02	064	2	2	4	2		2	1	4	2	2	1	1
02	065	2	4	2	2		4	1	3	2	3	1	1
02	066	2	5	2	3		1	1	2	3	3	2	1
02	067	2	4	4	2		3	1	3	1	2	1	1
02	068	2	2	4	2		1	1	5	2	2	1	1
02	069	2	3	3	2		5	1	3	2	2	1	1
02	070	2	1	4	1	2	2	1	3	1	3	1	1
02	071	2	1	3	1	2	2	1	3	1	2	1	1
02	072	2	4	4	1	2	5	1	3	1	2	1	1
02	073	2	3	3	1	2	2	1	3	2	2	1	1
02	074	2	2	5	2		2	1	5	1	2	1	1
02	075	2	2	5	2		1	1	3	2	2	1	1
02	076	1	2	5	3		2	1	3	2	2	1	1
02	077	1	1	5	3		5	1	3	2	2	1	1
02	078	2	5	3	2		1	1	5	3	2	1	1
02	079	2	5	5	1	3	1	1	3	1	2	1	1
02	080	2	2	2	2		2	1	3	1	2	1	1
02	081	1	2	4	1	2	2	1	3	3	2	1	1
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02	083	2	4	5	2		5	1	4	2	2	1	1
02	084	2	4	3	1	2	1	1	2	1	3	1	1
02	085	2	5	4	1	2	1	1	1	1	1	1	1
02	086	1	4	1	4		1	1	3	2	2	1	1
02	087	1	2	3	3		2	1	4	3	2	1	1
02	088	2	4	4	2		5	1	3	2	3	1	1
02	089	2	4	2	2		3	1	4	1	1	1	1
02	090	2	4	2	2		3	1	3	2	2	1	1
02	091	2	1	4	1	3	1	1	4	2	2	1	1
02	092	2	3	2	2		4	1	4	2	2	1	1
02	093	2	4	3	1	2	4	1	3	2	2	1	1
02	094	2	1	2	3		1	1	2	2	2	1	1
02	095	2	2	3	2		4	1	3	1	2	1	1
02	096	2	4	5	1	1	4	1	3	1	2	1	1
02	097	1	1	2	1	3	1	1	2	4		1	2
02	098	1	4	1	1	1	1	1	2	1	3	1	1
02	099	1	2	4	1	1	2	1	2	2	2	1	1
02	100	2	3	3	1	1	5	1	2	1	2	1	1
02	101	2	3	4	2		5	1	5	1	2	1	1
02	102	2	1	1	2		1	1	4	1	2	1	1
02	103	2	2	4	2		5	1	4	1	2	1	1
02	104	2	4	2	4		4	1	4	2	2	1	1
02	105	2	3	3	1	4	4	1	3	3	2	1	1
02	106	1	3	5	1	1	3	1	4	1	2	1	1
02	107	1	2	4	1	1	4	1	4	1	2	1	1
02	108	2	4	4	2		5	1	3	2	2	1	1
02	109	2	5	4	2		2	1	4	3	2	1	1

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
02	110	2	3	4	2		4	1	4	2	2	1	1
02	111	2	4	1	2		1	1	3	1	2	1	1
02	112	2	2	2	2		2	1	5	1	2	1	1
02	113	2	4	4	2		2	1	3	1	2	1	1
02	114	1	4	3	1	2	3	1	3	2	2	1	1
02	115	1	4	3	4		3	1	3	1	2	1	1
02	116	2	4	2	2		1	1	3	2	2	1	1
02	117	2	4	2	2		1	1	5	1	2	1	1
02	118	1	4	5	1	1	5	1	3	1	3	1	1
02	119	2	2	3	2		2	1	4	1	2	1	1
02	120	1	2	5	1	2	4	1	3	3	3	1	1
02	121	1	2	3	1	3	2	1	3	1	2	1	1
02	122	2	2	4	2		2	1	3	2	3	1	1
02	123	2	4	2	1	1	1	1	4	1	3	1	1
02	124	1	1	5	3		5	1	3	1	2	1	2
02	125	2	3	3	2		4	1	4	2	2	1	1
02	126	1	5	1	4		1	1	5	3	2	1	1
02	127	2	4	4	1	5	3	1	5	1	1	1	1
02	128	1	5	1	4		1	1	4	2	2	1	1
02	129	1	3	1	1	3	1	1	5	3	2	1	2
02	130	1	4	1	1	3	2	1	4	2	2	1	1
02	131	2	4	4	1	1	4	1	2	1	2	2	2
02	132	1	1	4	1	2	3	1	2	4		1	2
02	133	2	1	4	3		1	1	3	4		2	1
02	134	2	4	2	2		2	1	2	2	2	1	1
02	135	2	2	3	1	2	2	1	3	3	2	1	1
02	136	2	3	3	1	2	3	1	3	3	2	1	1
02	137	2	1	4	1	1	3	1	2	2	2	2	2
02	138	1	1	3	1	2	4	1	4	2	2	1	1
02	139	1	4	1	1	1	3	1	3	3	2	1	1
02	140	2	2	2	2		3	1	4	1	3	1	1
02	141	1	4	2	1	3	4	1	3	1	3	1	1
02	142	2	2	3	2		2	1	4	2	2	1	1
02	143	2	3	4	2		3	1	3	1	2	1	1
02	144	2	1	3	2		1	1	3	3	1	1	1
02	145	1	1	4	1	4	3	1	3	1	2	1	1
02	146	2	2	2	2		3	1	4	3	2	1	1
02	147	2	1	3	1	1	3	1	2	1	2	1	1
02	148	2	1	4	1	2	3	1	3	2	2	1	1
02	149	1	4	5	1	1	5	1	3	3	2	1	1
02	150	1	3	4	1	3	3	1	4	1	2	1	1
02	151	2	2	3	2		2	1	4	3	2	1	1
02	152	1	2	3	1	2	2	1	4	2	2	1	1
02	153	2	3	3	1	2	4	1	4	1	2	1	1
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02	155	2	5	1	2		1	1	4	3	2	1	1
02	156	1	5	1	1	3	1	1	5	1	3	1	1
02	157	2	2	4	2		4	1	4	2	2	1	1
02	158	2	4	2	2		2	1	3	1	2	1	1
02	159	2	5	4	4		2	1	3	1	2	1	1
02	160	2	5	5	4		1	1	3	1	3	1	1
02	161	2	5	3	4		1	1	3	1	2	1	1
02	162	1	3	4	1	1	5	1	5	1	2	1	1
02	163	2	5	4	4		1	1	4	1	2	1	1
02	164	1	4	4	1	2	4	1	3	3	1	1	1
02	165	1	1	2	3		3	1	4	2	2	1	1
02	166	1	4	4	1	1	5	1	4	1	2	1	1
02	167	1	5	1	1	3	3	2					
02	168	1	4	2	4		3	1	5	3	3	1	1
02	169	2	3	4	1	2	4	1	4	1	2	1	1
02	170	2	1	3	1	2	3	1	3	2	2	1	1
02	171	1	2	4	1	1	3	1	3	1	2	1	1
02	172	2	2	4	2		3	1	4	1	2	1	1
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02	174	1	4	4	1	1	5	1	4	1	2	1	1
02	175	2	3	4	2		4	1	3	1	2	1	1
02	176	1	1	1	1	3	2	1	3	1	3	1	1
02	177	1	1	2	1	3	2	1	5	1	2	1	1
02	178	1	1	2	1	2	2	1	4	1	2	1	1
02	179	2	1	5	2		5	1	4	1	2	1	1
02	180	1	5	1	4		2	1	3	1	2	1	1
02	181	1	5	2	4		3	1	2	1	2	1	2
02	182	2	1	2	3		2	1	4	4		1	1
02	183	1	3	3	1	2	3	1	3	3	3	1	1
02	184	1	2	5	1	1	5	1	4	2	2	1	1
02	185	1	2	4	3		4	1	3	1	2	1	1
02	186	2	1	5	1	1	2	1	3	2	2	1	1
02	187	1	4	3	1	2	3	1	2	2	2	1	1
02	188	1	1	2	3		2	1	3	1	3	1	1
02	189	1	5	2	4		2	1	3	3	2	1	1
02	190	2	3	3	2		4	1	3	3	1	1	1
02	191	1	4	2	1	4	2	1	3	2	2	1	1
02	192	2	4	2	2		2	1	3	3	3	1	1
02	193	1	2	2	5		2	1	3	4		1	1
02	194	2	4	3	2		5	1	3	1	2	1	1
02	195	2	1	4	1	3	2	1	3	2	2	1	1
02	196	2	5	5	4		1	1	3	1	3	1	1
02	197	1	4	3	5		1	1	5	2	2	2	2
02	198	2	4	2	2		3	1	4	1	3	1	1
02	199	1	5	1	5		1	1	4	1	2	1	1
02	200	2	4	1	2		1	1	4	3	2	1	1
02	201	1	3	1	1	3	3	1	4	1	3	1	1
02	202	2	4	1	2		4	1	5	3	1	1	1
02	203	2	5	1	2		1	1	5	1	2	1	1
02	204	2	5	3	2		1	1	4	1	2	1	1
02	205	2	5	4	4		1	1	4	3	2	1	1
02	206	2	2	5	2		3	1	3	2	2	2	1
02	207	2	3	5	2		5	1	3	2	2	1	1
02	208	2	3	4	2		5	1	3	2	2	1	1
02	209	1	5	1	5		4	1	3	3	1	1	1
02	210	1	2	3	1	3	2	1	3	3	1	1	1
02	211	2	1	2	2		2	1	4	1	2	1	1
02	212	1	5	3	4		3	1	4	3	2	1	1
02	213	1	4	1	1	3	1	1	4	1	2	1	1
02	214	1	5	1	4		1	1	3	4		1	1
02	215	2	5	1	2		1	1	3	1	2	1	1
02	216	1	2	4	1	2	4	1	3	2	2	1	1
02	217	1	1	3	1	1	4	1	5	1	2	1	1
02	218	1	4	2	1	3	1	1	4	2	2	1	1
02	219	2	2	5	2		4	1	3	2	2	1	1

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
02	220	2	4	1	2		1	1	2	2	2	2	1
02	221	1	1	4	3		1	1	3	3	2	1	1
02	222	1	2	4	1	2	4	1	3	1	2	1	1
02	223	2	4	3	2		1	1	5	1	2	1	1
02	224	1	4	3	1	1	4	1	4	1	2	1	1
02	225	2	2	3	2		3	1	4	1	2	1	1
02	226	2	3	2	2		3	1	4	3	2	1	1
02	227	2	2	3	2		3	1	5	1	2	1	1
02	228	2	1	4	2		2	1	4	2	2	1	1
02	229	1	1	5	1	4	2	1	3	4		2	1
02	230	2	1	4	1	1	2	1	3	2	2	1	1
02	231	2	3	5	5		2	1	3	3	2	1	1
02	232	2	2	3	2		3	1	4	2	3	1	1
02	233	2	4	2	2		3	1	3	2	2	1	1
02	234	1	2	4	1	2	3	1	3	1	3	1	1
02	235	1	3	2	1	2	2	1	3	2	2	1	1
02	236	2	3	4	5		1	1	3	3	1	1	1
02	237	2	3	2	1	2	3	1	3	1	2	2	2
02	238	2	1	2	3		2	1	1	3	3	2	1
02	239	1	2	4	1	3	3	1	3	3	2	1	1
02	240	2	2	3	2		1	1	1	4		2	2
02	241	1	1	3	1	3	3	1	5	2	2	1	1
02	242	1	1	4	1	3	2	1	3	2	2	1	1
02	243	1	1	4	1	1	4	1	3	2	2	1	1
02	244	1	2	3	1	3	3	1	5	3	2	1	1
02	245	2	2	1	1	4	1	1	1	1	3	2	1
02	246	2	2	1	1	4	1	1	1	1	3	2	1
02	247	1	3	4	1	1	5	1	3	3	2	1	1
02	248	1	2	2	1	1	3	1	2	4		1	1
02	249	1	2	3	1	1	2	1	3	3	3	1	1
02	250	1	2	3	1	1	3	1	3	2	2	1	1
02	251	1	1	5	1	2	4	1	4	2	2	1	1
02	252	1	4	2	1	2	3	1	3	2	2	1	1
02	253	2	4	5	1	1	3	1	5	1	2	1	1
02	254	2	4	4	2		4	1	2	2	2	1	1
02	255	1	4	4	4		4	1	3	1	3	1	1
02	256	1	4	5	1	1	5	1	4	1	2	1	1
02	257	1	2	5	1	1	4	1	4	3	2	1	1
02	258	1	1	5	1	1	4	1	4	2	2	1	1
02	259	2	4	1	2		1	1	3	1	2	1	1
02	260	2	4	3	2		3	1	3	1	2	1	1
02	261	1	4	3	4		2	1	3	3	2	1	1
02	262	1	2	4	1	1	4	1	3	3	2	2	1
02	263	1	3	5	1	1	3	1	3	3	1	1	1
02	264	2	4	1	2		3	1	3	2	2	1	1
02	265	1	4	5	1	3	3	1	3	1	2	1	1
02	266	1	4	4	5		1	1	4	1	2	1	1
02	267	2	2	5	2		4	1	4	2	2	1	1
02	268	2	2	2	2		3	1	3	1	2	1	1
02	269	2	2	2	2		1	1	4	1	2	2	1
02	270	1	2	3	1	3	5	1	2	3	2	1	1
02	271	2	4	3	2		2	1	5	1	2	1	1
02	272	2	2	2	2		3	1	3	1	2	1	1
02	273	2	2	1	1	4	3	1	3	2	2	1	1
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02	275	2	4	2	1	3	1	1	3	1	2	1	1
02	276	2	1	2	5		5	1	3	2	2	1	1
02	277	2	1	4	3		4	1	2	1	2	1	1
02	278	2	4	2	2		1	1	3	1	2	1	1
02	279	2	3	4	1	2	4	1	4	1	2	1	1
02	280	2	1	4	1	1	2	1	2	3	3	2	1
02	281	2	1	4	2		2	1	2	1	3	1	1
02	282	2	1	4	3		3	1	4	3	2	2	2
02	283	2	4	4	4		2	1	2	3	3	2	1
02	284	2	3	3	2		3	1	3	1	2	1	1
02	285	2	2	1	2		3	1	4	2	2	1	1
02	286	1	1	4	1	4	2	1	3	3	2	1	1
02	287	2	1	3	1	1	3	1	2	2	2	1	1
02	289	1	2	5	1	1	4	1	3	3	2	1	1

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
03	001	2	5	3	2		2	1	5	1	2	1	1
03	002	1	5	4	4		2	1	3	3	2	1	1
03	003	2	2	3	2		3	1	4	2	2	1	1
03	004	2	1	4	3		4	1	4	2	2	1	1
03	005	2	3	2	2		2	1	2	1	2	1	1
03	006	2	3	4	2		3	1	4	2	2	1	1
03	007	2	2	3	2		3	1	4	2	2	1	1
03	008	2	4	2	2		1	1	3	2	2	2	1
03	009	1	2	4	1	1	4	1	4	1	2	1	1
03	010	2	3	3	1	2	4	1	2	1	2	2	2
03	011	2	5	1	4		1	1	3	2	2	2	1
03	012	1	4	2	1	3	2	1	3	1	2	2	1
03	013	2	5	5	2		1	1	3	2	2	1	1
03	014	2	2	2	2		2	1	4	1	3	1	1
03	015	2	4	2	2		2	1	3	2	2	2	1
03	016	2	1	4	2		1	1	3	2	2	1	1
03	017	2	2	3	1	1	4	1	5	1	2	1	1
03	018	2	1	2	2		2	1	4	1	2	1	1
03	019	2	3	2	5		2	1	5	1	2	1	1
03	020	2	4	1	2		1	1	5	1	2	1	1
03	021	2	2	3	1	2	2	1	3	2	2	1	1
03	022	2	3	3	1	2	3	1	3	1	2	1	1
03	023	2	2	3	2		1	1	2	3	2	1	1
03	024	2	4	1	2		1	1	2	3	2	1	1
03	025	2	1	2	2		1	1	2	3	2	1	1
03	026	1	1	4	1	3	1	1	3	1	2	1	1
03	027	2	3	4	2		4	1	3	1	2	1	1
03	028	2	2	4	2		2	1	2	1	3	2	2
03	029	2	4	4	1	2	3	1	4	2	2	1	1
03	030	1	2	5	1	1	5	1	4	1	2	1	1
03	031	1	3	5	1	1	5	1	3	1	2	1	1
03	032	2	4	3	1	2	3	1	5	1	2	1	1
03	033	2	3	4	1	2	5	1	5	1	2	1	1
03	034	1	2	5	1	2	3	1	5	1	2	1	1
03	035	2	1	3	1	2	4	1	5	3	2	1	1
03	036	2	2	2	1	2	4	1	5	2	2	1	1
03	037	1	2	5	1	1	3	1	4	1	2	1	1
03	038	1	3	4	1	1	5	1	4	3	3	1	1
03	039	1	2	5	1	2	4	1	5	3	2	1	1
03	040	2	4	4	1	1	3	1	3	2	2	1	1
03	041	2	4	5	2		2	1	3	3	2	2	1
03	042	1	1	4	1	3	3	1	3	2	2	1	1
03	043	2	3	3	2		2	1	3	1	2	1	1
03	044	2	1	4	2		3	1	5	2	3	1	1
03	045	2	1	4	2		3	1	5	3	2	1	1
03	046	2	1	3	2		3	1	4	1	2	1	1
03	047	1	4	4	1	1	3	1	3	2	3	1	1
03	048	1	1	3	1	2	4	1	2	1	2	1	1
03	049	1	1	3	3		1	1	2	2	2	2	2
03	050	1	2	5	1	1	3	1	4	2	2	2	2
03	051	1	3	3	1	3	5	1	4	1	2	1	1
03	052	2	3	3	2		5	1	5	2	2	1	1
03	053	1	3	3	1	3	2	1	4	3	3	1	1
03	054	2	2	1	2		1	1	4	2	2	1	1

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
03	055	2	3	3	1	2	3	1	5	2	2	1	1
03	056	2	1	4	3		2	1	3	2	2	1	1
03	057	2	1	4	3		4	1	4	1	2	1	1
03	058	2	4	1	2		4	1	4	2	2	1	1
03	059	1	2	4	1	3	4	1	4	3	2	1	1
03	060	2	1	3	1	2	4	1	4	1	2	1	1
03	061	2	1	4	1	2	2	1	3	2	3	1	1
03	062	1	2	4	1	3	2	1	5	1	2	1	1
03	063	2	3	3	2		3	1	4	2	2	1	1
03	064	2	3	2	2		2	1	4	2	3	2	2
03	065	2	4	1	2		1	1	5	1	2	1	2
03	066	1	5	1	4		2	1	4	1	2	2	2
03	067	2	1	5	2		3	1	4	2	2	1	1
03	068	2	2	1	2		1	1	5	2	2	1	1
03	069	2	1	3	2		2	1	4	3	1	1	1
03	070	1	2	4	1	1	2	1	3	2	2	1	1
03	071	2	4	1	2		2	1	5	1	3	1	1
03	072	2	4	2	1	1	2	1	3	3	2	1	1
03	073	1	4	3	4		2	1	4	2	2	1	1
03	074	2	4	5	2		3	1	3	2	2	1	1
03	075	1	1	4	1	2	1	1	3	2	2	1	1
03	076	2	1	3	2		1	1	4	2	2	1	1
03	077	2	3	3	2		3	1	4	1	2	1	1
03	078	1	3	4	1	1	3	1	3	1	2	1	1
03	079	2	4	4	2		4	1	4	1	2	1	1
03	080	1	2	3	1	1	4	1	2	3	2	2	2
03	081	2	2	4	2		4	1	5	1	2	1	1
03	082	1	5	1	4		1	1	3	2	2	1	1
03	083	2	4	1	1	3	2	1	3	1	2	1	1
03	084	2	3	4	2		5	1	4	2	2	1	1
03	085	1	2	4	1	4	3	1	3	1	2	1	1
03	086	2	2	3	2		1	1	4	1	2	1	1
03	087	1	1	3	1	4	2	1	5	1	2	1	1
03	088	2	1	4	2		2	1	4	2	2	1	1
03	089	2	1	2	3		3	1	4	1	2	1	1
03	090	2	4	3	2		3	1	3	2	2	1	1
03	091	1	2	3	1	1	3	1	3	2	2	1	1
03	092	1	4	2	1		4	1	3	3	1	1	1
03	093	2	4	3	1	2	4	1	3	1	2	1	1
03	094	2	5	3	1	3	1	1	3	2	2	1	1
03	095	2	4	2	2		2	1	3	1	2	1	1
03	096	1	5	1	4		1	1	3	3	2	1	1
03	097	1	2	2	1	4	2	1	3	1	2	1	1
03	098	2	2	1	2		1	1	4	1	3	1	1
03	099	2	3	4	1	1	4	1	4	1	2	1	1
03	100	2	1	4	1	1	4	1	4	1	2	1	1
03	101	2	2	3	1	1	3	1	3	3	2	1	1
03	102	2	2	3	2		3	1	3	3	2	1	1
03	103	2	1	4	3		1	1	5	2	2	1	1
03	104	2	1	4	2		3	1	3	2	2	1	2
03	105	1	2	5	1	1	3	1	4	1	2	1	1
03	106	1	4	1	1	1	5	1	4	1	2	1	1
03	107	2	3	4	2		5	1	3	3	3	1	1
03	108	1	3	4	1	1	4	1	4	1	2	1	1
03	109	1	4	3	4		2	1	2	2	1	1	2

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
03	110	1	2	5	1	1	3	1	3	1	2	1	1
03	111	1	3	1	1	2	4	1	5	1	2	1	1
03	112	1	4	3	1	2	4	1	3	3	2	1	1
03	113	2	4	2	2		1	1	3	1	2	1	1
03	114	2	4	2	4		4	1	3	2	2	1	1
03	115	2	4	3	2		1	1	5	1	2	1	1
03	116	2	2	3	2		1	1	5	3	3	1	1
03	117	1	2	3	1	3	2	1	3	1	2	1	1
03	118	2	4	3	2		4	1	5	2	2	1	1
03	119	2	3	3	2		3	1	4	1	2	1	1
03	120	2	3	3	2		5	1	4	1	2	1	1
03	121	2	2	3	2		4	1	4	1	2	1	1
03	122	1	1	5	1	1	2	1	4	2	2	1	1
03	123	2	2	3	1	2	4	1	3	3	2	1	1
03	124	2	4	3	2		5	1	5	1	2	1	1
03	125	2	1	2	2		1	1	5	1	2	1	1
03	126	1	2	3	1	3	4	1	5	2	2	1	1
03	127	1	2	1	1	3	3	1	5	2	2	1	1
03	128	1	5	2	4		1	1	4	1	3	1	1
03	129	1	5	4	4		3	1	4	1	3	1	1
03	130	2	3	3	2		2	1	5	1	2	1	1
03	131	1	3	3	1	3	3	1	4	1	2	1	1
03	132	2	1	1	2		1	1	5	1	2	2	1
03	133	2	1	3	2		2	1	4	3	2	2	1
03	134	2	2	3	2		1	1	5	1	2	1	1
03	135	2	1	2	5		1	1	5	1	2	1	1
03	136	2	4	1	2		1	1	1	1	1	2	1
03	137	1	2	3	1	4	2	1	4	2	2	1	1
03	138	2	2	4	2		2	1	5	2	2	1	1
03	139	2	3	1	2		2	2					
03	140	1	4	2	1	3	2	1	5	3	1	1	1
03	141	2	4	1	2		1	1	4	4		1	1
03	142	1	4	1	1	3	2	1	5	3	2	1	1
03	143	2	4	4	2		4	1	3	1	2	1	1
03	144	1	1	4	1	3	2	1	2	3	2	1	1
03	145	1	3	4	1	4	3	1	5	1	2	1	1
03	146	2	3	4	2		4	1	3	2	2	1	1
03	147	1	4	4	1	2	3	1	2	1	3	2	2
03	148	2	4	2	2		1	1	4	1	2	1	1
03	149	1	1	3	1	4	2	1	3	2	2	1	1
03	150	2	4	1	2		1	1	5	1	2	1	1
03	151	2	2	2	2		2	1	3	2	2	1	1
03	152	2	1	2	2		3	1	3	2	2	1	1
03	153	2	1	2	2		1	1	3	3	2	1	1
03	154	2	2	3	2		2	1	4	1	2	1	1
03	155	2	5	1	2		1	1	4	2	2	1	1
03	156	2	4	1	2		3	1	4	2	2	1	1
03	157	2	1	3	1	2	2	1	5	1	2	1	1
03	158	1	2	3	1	1	3	1	3	3	2	1	1
03	159	2	3	2	2		2	1	4	1	2	1	1
03	160	2	3	1	2		2	1	4	1	2	1	1
03	161	2	1	4	1	2	2	1	4	2	2	1	1
03	162	2	1	4	3		2	1	4	2	2	1	1
03	163	2	2	5	1	1	2	1	4	1	2	1	1
03	164	2	4	2	2		3	1	3	1	2	1	1

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
03	165	2	5	2	4		1	1	3	3	2	1	1
03	166	1	3	2	1		3	1	3	3	2	1	1
03	167	2	3	3	2		3	1	3	3	2	1	1
03	168	1	2	5	1	1	4	1	3	1	2	1	1
03	169	1	4	5	1	1	4	1	3	1	2	1	1
03	170	2	2	1	2		2	1	3	1	3	1	1
03	171	1	3	4	1	1	3	1	3	2	1	1	1
03	172	2	2	4	2		3	1	3	2	2	1	1
03	173	2	3	1	2		3	1	3	1	2	1	1
03	174	2	2	2	2		2	1	3	1	2	1	1
03	175	1	4	1	1	3	2	1	3	1	2	1	1
03	176	2	4	1	1	4	1	1	3	3	2	1	1
03	177	1	1	4	3		3	1	3	2	2	1	1
03	178	1	1	4	3		4	1	3	3	2	1	1
03	179	2	4	4	1	1	3	1	4	1	2	1	1
03	180	2	1	1	3		2	1	4	1	2	1	1
03	181	2	1	4	3		3	1	3	2	2	1	1
03	182	2	3	4	1	1	3	1	4	1	2	1	1
03	183	2	1	4	3	2	3	1	5	1	2	1	1
03	184	2	1	4	3		2	1	5	3	2	1	1
03	185	2	4	1	5		3	1	4	2	2	1	1
03	186	2	1	4	3		4	1	4	3	2	1	1
03	187	2	3	3	2		4	1	4	1	2	1	1
03	188	2	1	4	3		4	1	5	1	2	1	1
03	189	2	2	2	1	1	2	1	5	3	1	1	1
03	190	2	2	4	1	4	3	1	2	3	2	1	1
03	191	2	5	1	4		1	1	4	2	2	1	2
03	192	2	5	2	2		4	1	4	1	3	1	1
03	193	2	3	1	2		3	1	3	1	2	1	1
03	194	1	1	4	1	2	3	1	4	1	2	1	1
03	195	2	2	3	1	2	2	1	4	3	2	1	1
03	196	2	1	3	2		3	1	3	3	2	1	1
03	197	2	2	4	1	1	2	1	4	1	3	1	1
03	198	2	3	2	1	1	4	1	3	2	2	1	1
03	199	1	5	3	4		1	1	3	2	2	1	1
03	200	1	5	2	4		1	1	4	1	2	1	1
03	201	1	4	5	1	1	5	1	3	3	2	1	1
03	202	1	2	3	1	3	2	1	5	3	2	1	1
03	203	2	5	1	2		1	1	5	1	3	1	1
03	204	2	1	3	1	2	3	1	3	3	2	1	1
03	205	2	3	3	1	2	4	1	3	1	2	1	1
03	206	1	1	3	1	3	1	1	5	3	2	1	1
03	207	1	2	3	1	1	2	1	4	2	2	2	1
03	208	1	2	2	1	3	2	1	3	3	2	1	1
03	209	2	1	2	1	4	4	1	5	3	1	1	1
03	210	2	2	3	1	1	4	1	3	1	3	1	1
03	211	1	3	5	1	1	5	1	3	1	2	1	1
03	212	1	2	3	1	3	3	1	3	1	2	1	1
03	213	2	4	5	2		2	1	4	1	2	1	1
03	214	2	3	3	2		4	1	5	4		1	1
03	215	1	4	5	4		2	1	2	3	1	2	1
03	216	1	2	4	1	2	5	1	2	2	2	2	2
03	217	2	1	2	2		3	1	3	1	2	1	1
03	218	1	1	4	3		1	1	3	2	2	1	1
03	219	2	1	4	3	3	3	1	4	2	2	1	1

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
03	220	2	3	3	2		4	1	4	1	2	1	1
03	221	1	2	3	1	3	3	1	3	3	2	1	1
03	222	2	2	3	2		3	1	4	1	3	1	1
03	223	2	3	1	2		4	1	2	3	2	2	2
03	224	2	1	2	2		3	1	4	3	2	1	1
03	225	2	4	1	2		1	1	5	3	2	1	1
03	226	2	1	1	2		1	1	5	1	2	1	1
03	227	1	2	1	1	3	1	1	2	2	2	1	1
03	228	1	1	2	1	3	1	1	3	2	2	1	1
03	229	2	4	2	4		2	1	5	1	2	1	1
03	230	1	4	1	4		2	1	4	2	2	1	1
03	231	1	4	4	1	4	4	1	3	3	2	1	1
03	232	2	4	2	5	3	1	1	5	1	2	1	1
03	233	2	4	4	2		2	1	1	2	2	2	2
03	234	2	3	3	1	1	5	1	3	3	2	2	2
03	235	1	4	2	1	3	3	1	3	3	2	2	1
03	236	1	4	4	1	1	4	1	4	2	2	1	1
03	237	2	3	2	1		3	1	5	1	2	1	1
03	238	2	4	4	1	1	3	1	5	2	3	1	1
03	239	1	2	4	1	1	4	1	3	2	2	2	1
03	240	2	2	3	2		2	1	3	1	2	1	1
03	241	2	1	3	1	2	2	1	3	3	2	2	2
03	242	2	3	3	2		2	1	3	1	2	1	1
03	243	1	1	4	1	1	4	1	3	3	2	1	1
03	244	2	4	4	2		5	1	5	2	2	1	1
03	245	2	5	2	2		1	1	5	2	2	1	1
03	246	2	3	3	1	1	5	1	4	1	2	1	1
03	247	1	4	4	1	3	5	1	4	2	2	1	1
03	248	1	4	4	1	2	3	1	3	2	2	1	2
03	249	2	4	4	2		5	1	2	3	3	2	2
03	250	2	5	2	4		1	1	5	1	3	1	1
03	251	2	5	4	4		1	1	5	1	3	1	1
03	252	1	2	4	5		2	1	4	1	2	1	1
03	253	1	3	1	1	3	1	1	4	1	1	1	1
03	254	1	4	3	1	4	3	1	3	3	2	1	1
03	255	1	4	5	4		4	1	4	3	1	1	1
03	256	1	2	5	3		3	1	3	2	2	1	1
03	257	2	4	2	2		3	1	5	1	2	1	1
03	258	1	5	2	1	3	3	1	3	1	2	1	1
03	259	1	1	3	1	3	2	1	4	3	2	1	1
03	260	1	2	1	1	1	3	1	1	3	2	2	2
03	261	1	1	4	1	2	2	1	3	3	2	1	1
03	262	2	4	3	2		4	1	3	2	2	1	1
03	263	1	2	5	1	1	3	1	3	2	2	2	2
03	264	1	3	5	5		4	1	5	1	2	1	1
03	265	1	4	5	5		4	1	5	1	2	1	1
03	266	1	1	4	1	3	2	1	5	1	2	1	1
03	267	1	5	2	4		1	1	5	4		1	1
03	268	2	5	3	2		1	1	3	3	2	1	1
03	269	1	2	3	1	3	3	1	2	2	1	1	1
03	270	1	5	2	4		1	1	3	3	1	1	1
03	271	2	1	3	1	2	3	1	2	2	2	2	1
03	272	1	3	4	4		4	1	3	1	2	1	1
03	273	1	4	4	1	4	4	1	3	1	2	1	1
03	274	1	4	3	1	3	3	1	3	1	2	1	1
03	275	2	1	3	1	4	5	1	3	3	2	1	1
03	276	2	2	3	1	2	2	1	3	3	2	1	1
03	277	2	3	3	2		2	1	3	2	3	1	1
03	278	2	2	3	2		2	1	5	1	2	1	1
03	279	2	5	2	2		1	1	3	1	2	1	1
03	280	2	4	2	2		3	1	3	1	2	1	1
03	281	1	1	3	1	3	2	1	3	3	3	1	1
03	282	2	1	2	2		2	1	3	1	2	2	1
03	283	2	3	2	1	2	2	1	3	1	2	1	1
03	284	2	5	1	2		2	1	4	3	2	2	1
03	285	2	3	4	2		3	1	2	3	2	1	1
03	286	2	3	4	2		5	1	3	3	2	1	1
03	287	2	3	2	2		4	1	3	1	2	1	1
03	288	2	1	3	2		2	1	4	1	2	1	1
03	289	1	3	5	1	1	5	1	4	1	2	1	1
03	290	1	3	2	1	3	3	1	4	1	2	1	1
03	291	2	4	4	2		2	1	3	2	2	1	1
03	292	2	2	4	2		4	1	5	3	2	1	1
03	293	1	5	1	1	4	1	1	3	1	3	1	1
03	294	1	5	3	4		1	2					
03	295	2	5	1	4		1	1	5	3	2	1	1
03	296	2	2	4	1	2	1	1	4	2	2	1	1
03	297	2	3	4	2		4	1	5	1	2	1	1
03	298	1	4	3	1	4	5	1	4	2	2	1	1
03	299	1	5	4	1	3	2	1	5	2	2	1	1
03	300	2	2	4	2		2	1	5	1	2	1	1
03	301	1	4	5	1	1	5	1	5	1	2	1	1
03	302	2	1	3	2		5	1	4	3	2	1	1
03	303	2	2	3	3		3	1	3	2	2	1	1
03	304	1	3	3	1	3	3	1	4	2	2	1	1
03	305	2	3	3	2		2	1	5	3	2	1	1
03	306	2	3	3	2		3	1	4	1	3	1	1
03	307	1	3	3	1	3	3	1	4	1	3	1	1
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03	309	2	1	2	3		2	1	3	1	3	1	1
03	310	1	1	2	3		1	1	3	1	2	1	1
03	311	2	3	3	2		2	1	3	1	2	1	1
03	312	2	3	2	2		2	1	4	1	2	2	2
03	313	2	3	3	2		2	1	5	2	3	1	1
03	314	2	2	3	2		2	1	4	1	2	1	1
03	315	1	2	3	1	4	2	1	5	1	2	1	1
03	316	1	2	5	1	1	3	1	3	1	2	1	1
03	317	2	5	4	1	2	3	1	3	2	3	2	1
03	318	1	4	5	1	1	4	1	3	2	2	1	1
03	319	2	1	3	2		5	1	3	2	1	1	1
03	320	2	4	3	2		4	1	3	2	2	1	1
03	321	2	1	2	3		2	1	3	1	2	1	1
03	322	2	1	3	3		1	1	5	1	2	1	1
03	323	2	5	3	2		3	1	5	2	2	1	1
03	324	1	2	5	1	1	5	1	4	2	2	1	1
03	325	1	2	5	1	1	3	1	4	3	2	1	1
03	326	2	1	4	1	2	1	1	5	2	2	1	1
03	327	2	1	3	1	2	3	1	3	3	2	2	1
03	328	2	4	5	1	2	4	1	2	4		2	2
03	329	2	5	3	4		1	1	3	3	2	1	1

Test Site Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
03330	2	1	2	2		2	1	3	2	3	1	1
03331	1	1	4	1	1	1	1	5	2	2	1	1
03332	2	1	3	1	2	1	1	5	2	2	1	1
03333	2	2	4	2		3	1	3	2	3	1	1
03334	2	3	4	2		5	1	4	2	2	1	1
03335	1	1	5	1	1	4	1	4	2	3	2	1
03336	1	4	3	5		5	1	3	4		1	1
03337	2	4	3	2		2	1	5	1	2	1	1
03338	1	5	4	4		2	1	3	3	2	1	1
03339	1	4	5	4		5	1	4	1	2	1	1
03340	1	4	2	1	3	3	1	3	2	3	1	1
03341	2	5	1	2		1	1	5	3	2	1	1
03342	1	5	1	4		1	1	5	3	2	1	1
03343	1	5	1	4		1	1	4	1	3	1	1
03344	2	2	3	2		3	1	4	1	2	1	1
03345	1	3	1	1	3	2	2					
03346	1	4	5	1	1	5	1	4	1	2	1	1
03347	1	4	4	1	4	3	1	4	1	3	1	1
03348	1	4	3	1	1	3	1	3	1	2	1	1
03349	2	3	1	2		2	1	5	2	2	1	1
03350	2	3	3	2		2	1	4	1	2	1	1
03351	1	1	5	3		2	1	4	1	2	1	1
03352	2	2	2	2		2	1	3	3	2	1	1
03353	2	2	4	2		4	1	4	1	2	1	1
03354	2	3	1	2		2	1	4	3	2	1	1
03355	1	3	4	1	1	4	1	4	2	3	1	1
03356	1	5	2	4		2	1	3	3	3	1	1

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
04	001	2	5	1	2		1	1	3	3	2	1	1
04	002	1	5	2	4		2	1	3	1	2	1	1
04	003	2	2	3	2		3	1	3	3	2	1	1
04	004	2	2	3	2		3	1	3	3	2	1	1
04	005	1	4	4	4		4	1	3	1	2	1	1
04	006	2	4	1	2		4	1	3	2	2	1	1
04	007	1	2	3	1	3	3	1	3	2	2	1	1
04	008	2	4	1	2		3	1	3	1	2	1	1
04	009	1	4	3	1	3	3	1	4	1	2	1	1
04	010	2	5	5	4		3	2					
04	011	1	5	1	4		1	2					
04	012	2	1	4	1	1	3	1	3	1	3	1	1
04	013	2	1	2	1	3	3	1	3	2	2	1	1
04	014	1	5	4	4		2	1	2	3	2	2	2
04	015	1	2	4	1	3	3	1	3	2	2	1	1
04	016	2	4	2	2		4	1	2	2	2	1	1
04	017	2	4	1	1	3	2	1	2	2	3	1	1
04	018	1	5	1	4		1	1	2	1	2	1	1
04	019	2	4	3	2		1	1	3	1	2	1	1
04	020	2	5	1	2		1	1	3	3	2	1	1
04	021	2	4	1	2		1	1	4	1	2	1	1
04	022	1	5	1	4		1	1	3	1	2	1	1
04	023	2	5	2	2		2	1	3	1	2	1	1
04	024	2	2	3	2		3	1	4	1	2	1	1
04	025	2	3	4	2		3	1	3	1	2	1	1
04	026	2	4	4	2		3	1	3	1	2	1	1
04	027	2	2	4	2		3	1	2	1	3	2	1
04	028	1	1	4	1	2	4	1	3	3	3	1	1
04	029	2	1	4	3		2	1	2	2	2	1	1
04	030	2	1	4	3		4	1	2	1	2	1	1
04	031	2	1	4	3		3	1	2	2	2	1	1
04	032	1	5	1	4		1	1	5	3	2	1	1
04	033	1	1	4	3		3	1	3	2	2	1	1
04	034	2	4	4	2		3	1	3	3	2	1	1
04	035	2	3	3	2		3	1	3	1	2	1	1
04	036	2	4	4	2		4	1	3	3	2	1	1
04	037	1	1	3	1	4	2	1	3	2	2	1	1
04	038	1	1	3	1	3	1	1	3	1	2	1	1
04	039	1	3	4	1	2	4	1	3	3	2	1	1
04	040	2	4	3	1	1	3	1	3	1	3	1	1
04	041	2	4	2	2		5	1	3	2	2	1	1
04	042	2	4	3	2		3	1	3	2	2	1	1
04	043	2	2	3	2		3	1	3	2	3	1	1
04	044	2	2	1	1	3	2	1	4	4		1	1
04	045	2	1	3	5		2	1	2	3	3	1	1
04	046	1	5	4	4		2	1	4	1	3	1	1
04	047	2	4	3	2		2	1	5	1	2	1	1
04	048	1	4	3	1	1	4	1	2	2	1	1	1
04	049	2	4	3	2		3	2					
04	050	2	1	3	2		2	1	3	1	2	1	2
04	051	1	2	5	1	1	5	1	3	2	2	1	1
04	052	2	3	1	2		3	1	3	1	2	1	1
04	053	1	1	4	3		5	1	3	1	2	1	1
04	054	1	5	1	4		1	1	2	1	2	1	1
04	055	2	4	4	1	1	2	1	3	2	2	1	1
04	056	2	4	3	2		1	1	4	3	2	1	1
04	057	2	5	2	2		1	1	4	1	2	1	1
04	058	1	1	4	1	4	3	1	3	3	2	1	1
04	059	2	4	5	2		2	1	3	1	2	1	1
04	060	1	5	5	4		2	1	3	3	3	1	1
04	061	1	5	4	4		4	1	3	2	2	1	1
04	062	2	5	2	2		1	1	3	2	2	1	1
04	063	2	5	4	4		2	1	4	2	2	1	1
04	064	1	5	1	4		2	1	3	4		1	1
04	065	1	2	5	1	1	5	1	1	2	3	2	2
04	066	2	5	3	2		3	1	3	1	2	1	1
04	067	1	5	1	4		2	1	2	2	2	2	2
04	068	1	3	2	1	3	3	1	2	2	2	1	1
04	069	2	4	4	2		3	1	2	3	2	2	2
04	070	2	4	4	2		1	1	3	3	2	2	1
04	071	2	5	3	1	3	1	1	3	3	2	1	1
04	072	2	5	5	4		1	1	2	3	2	2	2
04	073	2	4	1	2		2	1	3	1	2	1	1
04	074	1	1	2	3		3	1	3	2	2	1	1
04	075	1	4	2	1	2	3	1	3	3	1	1	1
04	076	2	5	3	1	2	2	1	1	4		2	2
04	077	2	1	4	1	2	5	1	4	3	2	1	1
04	078	2	4	4	2		5	1	3	1	2	1	1
04	079	2	2	4	2		2	1	4	2	2	1	1
04	080	2	5	4	4		1	1	2	4		2	2
04	081	1	1	2	3		4	1	3	1	2	1	1
04	082	2	1	2	3		4	2					
04	083	2	1	2	3		4	1	3	3	2	1	1
04	084	2	4	3	1	4	4	1	3	2	2	1	1
04	085	2	5	4	2		1	1	3	2	2	1	1
04	086	2	5	3	4		2	1	3	1	2	1	1
04	087	1	2	5	1	1	5	2					
04	088	2	1	1	3		5	1	3	1	3	2	1
04	089	2	1	4	3		5	1	3	3	2	2	1
04	090	1	1	3	1	1	2	1	3	3	3	2	1
04	091	2	4	4	2		4	1	3	1	2	1	1
04	092	1	5	1	4		3	1	2	1	2	2	1
04	093	1	2	3	1	3	2	1	3	3	1	1	1
04	094	1	1	2	1	3	2	1	2	3	2	1	2
04	095	2	1	4	1	3	5	1	2	3	2	1	1
04	096	1	4	2	1	4	1	1	1	2	3	2	2
04	097	2	1	2	3		2	1	3	2	2	1	1
04	098	1	4	1	4		1	1	4	4		1	1
04	099	1	5	1	4		1	1	3	1	2	1	1
04	100	1	4	1	1	4	2	1	4	1	2	1	1
04	101	2	3	4	1	1	4	1	4	3	2	1	1
04	102	2	4	3	2		4	1	3	1	2	1	1
04	103	2	3	2	2		4	1	3	3	3	1	1
04	104	1	1	2	3		2	1	3	3	3	1	1
04	105	1	1	2	3		2	1	2	2	2	2	1
04	106	1	4	1	1	3	3	1	3	3	2	1	1
04	107	1	1	2	1	4	1	1	4	1	2	1	1
04	108	1	1	2	3		2	1	3	2	2	2	1
04	109	1	1	2	3		4	1	3	3	2	1	1

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
04	110	1	3	2	4		1	1	3	3	3	1	1
04	111	1	4	3	1	3	4	1	2	3	3	1	1
04	112	1	1	3	3		1	1	3	4		2	1
04	113	1	1	2	3		3	1	3	3	2	1	1
04	114	1	1	1	1	4	1	1	4	3	2	1	1
04	115	2	1	2	2		1	1	2	3	3	2	2
04	116	1	1	4	1	3	2	1	4	1	2	1	1
04	117	1	1	3	1	4	4	1	3	3	1	1	1
04	118	2	1	3	1	2	2	1	2	3	2	2	1
04	119	2	4	3	4		2	1	3	1	2	1	1
04	120	1	3	1	1	3	2	1	2	3	3	2	2
04	121	1	5	3	4		2	1	3	2	2	1	1
04	122	2	4	4	2		3	1	4	3	2	1	1
04	123	1	2	3	3		2	1	3	3	2	1	1
04	124	2	3	2	1	3	2	1	3	2	2	1	1
04	125	2	2	2	2		2	1	3	3	2	1	1
04	126	1	3	2	1	3	2	1	1	2	1	2	2
04	127	1	2	4	1	2	4	1	3	2	3	1	1
04	128	1	3	2	1	2	4	1	4	1	3	1	1
04	129	1	2	5	1	2	3	1	4	2	2	1	1
04	130	1	4	3	1	4	2	1	4	1	2	1	1
04	131	1	5	2	4		3	1	3	2	2	1	1
04	132	2	2	3	1	2	4	1	2	3	1	1	1
04	133	2	3	3	2		3	1	3	1	2	1	1
04	134	1	3	2	1	3	4	1	4	3	3	1	1
04	135	1	3	1	1	4	1	1	1	3	2	2	2
04	136	2	3	4	2		5	1	3	2	2	1	1
04	137	1	1	4	3		4	1	3	2	2	1	1
04	138	1	1	4	3		4	1	3	1	2	1	1
04	139	2	2	2	2		3	1	4	3	2	1	1
04	140	2	4	3	2		3	1	3	3	2	1	1
04	141	2	1	2	2		2	1	4	3	2	1	1
04	142	1	4	2	4		1	1	3	3	1	1	1
04	143	2	1	4	1	2	3	1	4	1	2	1	1
04	144	2	2	3	1	2	1	1	4	2	2	1	1
04	145	2	3	2	2		3	2					
04	146	1	5	2	4		2	1	2	4		2	2
04	147	2	4	4	1	2	5	1	3	1	2	1	1
04	148	1	5	4	1	3	3	1	3	1	2	1	1
04	149	2	1	2	2		2	1	2	3	2	2	2
04	150	2	3	3	1	2	1	1	5	1	2	1	1
04	151	1	5	3	4		2	1	3	2	2	1	1
04	152	2	5	3	2		3	1	4	3	2	1	1
04	153	1	4	3	1	3	4	1	3	1	3	1	1
04	154	2	2	3	2		3	1	3	1	2	1	1
04	155	1	2	4	1	4	3	1	4	1	2	1	1
04	156	2	2	3	2		3	1	2	3	3	1	1
04	157	2	4	3	2		5	1	2	1	2	1	1
04	158	2	1	3	2		3	1	3	2	2	1	1
04	159	2	2	2	2		2	1	3	1	2	1	1
04	160	2	3	3	2		3	2					
04	161	2	1	3	1	2	1	1	4	1	3	1	1
04	162	1	1	1	1	2	1	1	4	4		1	2
04	163	2	2	5	2		4	2					
04	164	1	2	5	1	1	4	1	1	2	2	1	2
04	165	1	2	4	1	1	4	1	3	3	3	1	1
04	166	2	3	3	1	2	4	1	3	1	2	1	1
04	167	2	5	3	2		2	1	3	1	2	1	1
04	168	2	4	5	1	1	4	1	2	1	2	2	2
04	169	2	4	4	2		3	1	3	2	2	1	1
04	170	1	3	1	1	4	1	1	2	1	2	2	1
04	171	1	2	2	1	3	2	1	2	3	3	2	2
04	172	2	2	3	2		5	1	3	3	2	1	1
04	173	2	4	3	2		4	1	2	2	2	2	2
04	174	1	3	2	1	1	3	1	2	1	2	2	2
04	175	1	4	3	1	2	3	1	3	2	2	1	1
04	176	2	2	4	2		2	1	4	3	2	1	1
04	177	1	5	2	4		1	1	2	1	2	2	2
04	178	1	1	3	1	3	1	1	1	3	2	2	2
04	179	2	1	4	1	2	1	1	3	1	2	1	1
04	180	1	2	5	1	2	4	1	3	1	2	1	1
04	181	1	4	4	4		5	1	2	2	2	2	2
04	182	1	1	4	3		5	1	3	1	2	1	1
04	183	1	1	4	3		5	1	3	2	3	1	1
04	184	2	4	2	1	2	4	1	2	1	3	1	1
04	185	2	4	4	2		3	1	3	1	3	1	1
04	186	1	3	5	1	1	5	1	2	2	2	2	2
04	187	1	2	3	1	1	3	1	3	2	2	1	1
04	188	1	1	3	1	1	3	1	3	3	2	1	1
04	189	1	5	3	4		4	2					
04	190	1	4	3	1	3	3	1	3	2	2	1	1
04	191	1	2	3	1	2	5	1	4	1	2	1	1
04	192	1	4	3	1	4	2	1	3	1	2	1	1
04	193	1	3	3	1	1	3	1	3	3	2	1	1
04	194	1	3	5	1	1	3	1	3	2	3	1	1
04	195	1	2	4	1	1	4	1	3	1	3	1	1
04	196	2	2	3	2		3	1	2	3	2	2	1
04	197	1	2	4	5		2	1	3	2	2	1	1
04	198	1	3	4	1	2	3	1	3	1	3	1	1
04	199	1	5	1	1	3	1	1	2	1	3	1	1
04	200	2	4	1	2		1	1	2	1	1	1	1
04	201	2	5	4	2		1	1	4	1	2	1	1
04	202	2	4	3	2		4	1	1	4		2	2
04	203	1	4	2	1	3	1	1	3	1	2	1	1
04	204	2	4	2	2		4	1	3	3	2	2	1
04	205	2	5	4	4		2	1	4	2	2	1	1
04	206	2	1	1	2		1	1	3	4	1	2	1
04	207	1	2	2	1	3	1	1	4	2	2	1	1
04	208	1	2	4	1	3	2	1	2	3	3	2	2
04	209	2	1	4	1	1	3	1	3	2	2	1	1
04	210	1	1	3	1	4	4	1	3	3	2	2	2
04	211	1	1	2	3		2	1	3	1	2	1	1
04	212	2	4	4	2		1	1	4	2	2	1	1
04	213	1	2	4	5		4	1	3	1	3	1	1
04	214	2	2	4	1	2	5	1	3	1	2	1	1
04	215	2	1	3	1	4	1	1	3	3	2	1	1
04	216	1	1	1	1	2	1	1	4	1	2	2	2
04	217	1	1	1	1	1	1	1	2	1	2	2	2
04	218	2	1	4	3	3	1	1	3	2	2	1	1
04	219	1	1	3	1	3	1	1	2	3	2	2	2

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
04	220	1	3	5	1	1	5	1	1	2	2	2	2
04	221	1	3	3	1	3	2	1	3	3	2	1	1
04	222	1	4	5	1	3	5	1	3	1	1	1	1
04	223	1	5	3	4		3	1	2	1	3	2	1
04	224	1	1	4	1	1	3	1	3	2	2	2	1
04	225	2	2	2	2		3	1	3	3	2	1	1
04	226	2	2	4	2		3	1	3	3	3	1	1
04	227	1	4	1	1	3	2	1	3	1	2	1	1
04	228	2	3	5	2		3	1	3	2	2	1	1
04	229	2	1	3	2		3	1	3	2	2	1	1
04	230	2	4	2	4		1	1	4	2	2	1	1
04	231	2	3	3	2		2	1	3	1	2	1	1
04	232	1	4	2	1	3	3	1	2	3	2	1	1
04	233	2	3	3	2		3	1	3	1	2	1	1
04	234	1	5	2	1	3	1	1	3	2	3	1	1
04	235		2	3	1	3	2	1	2	3	1	2	2
04	236	1	1	4	1	1	4	1	2	3	2	2	1
04	237	1	2	2	5		3	1	4	1	2	1	1
04	238	2	4	4	4		1	1	3	1	2	1	1
04	239	2	3	2	2		4	1	2	1	2	1	1
04	240	2	4	4	2		3	1	3	1	2	1	1
04	241	2	4	2	2		2	1	3	2	2	1	1
04	242	2	4	4	2		5	1	3	1	2	1	1
04	243	1	4	1	1	3	2	1	2	3	3	1	1
04	244	1	2	4	1	1	4	1	2	2	3	1	1
04	245	2	4	3	2		3	1	3	2	2	1	1
04	246	1	1	4	1	1	2	1	3	2	2	1	1
04	247	2	2	2	2		2	1	3	1	2	2	1
04	248	2	3	5	2		4	1	2	1	3	1	1
04	249	2	5	5	4		1	1	3	1	2	1	1
04	250	2	4	3	2		2	1	2	3	1	1	1
04	251	1	1	4	3		2	1	3	2	2	1	1
04	252	2	3	5	1	1	5	1	3	2	2	1	1
04	253	1	2	3	1	2	4	1	1	1	2	2	2
04	254	2	4	3	2		5	1	4	1	2	1	1
04	255	2	4	4	2		5	1	3	2	2	1	1
04	256	1	4	1	4		4	1	3	1	3	1	1
04	257	1	2	4	1	2	3	1	2	3	1	1	1
04	258	1	1	4	3		1	1	2	3	2	2	1
04	259	1	5	4	4		1	1	3	1	3	2	2
04	260	2	5	2	1	2	1	1	3	3	1	1	1
04	261	1	4	2	4		2	1	4	1	2	1	1
04	262	1	5	1	4		3	1	1	3	2	1	1
04	263	2	5	4	5		3	1	2	3	2	2	1
04	264	1	3	1	1	4	1	1	2	2	3	2	2
04	265	1	3	2	1	3	2	1	3	1	2	1	1
04	266	1	5	2	4		1	1	1	2	1	2	2
04	267	2	5	3	2		1	1	2	2	2	2	1
04	268	2	3	3	2		2	1	3	1	2	1	1
04	269	1	1	2	1	1	3	1	3	1	2	1	1
04	270	1	1	3	1	3	1	1	3	2	2	1	1
04	271	2	4	4	1	2	2	1	3	3	2	1	1
04	272	2	2	4	2		4	1	3	3	2	1	1
04	273	2	4	3	1	2	2	1	1	4		2	2
04	274	1	4	2	1	3	4	1	3	2	2	1	1
04	275	2	4	4	4		4	1	4	1	2	1	1
04	276	1	3	1	1	2	3	1	2	1	2	1	1
04	277	1	4	1	1	4	1	1	3	1	2	1	1
04	278	2	4	2	2		5	1	2	3	2	2	1
04	279	1	1	2	1	1	5	1	2	3	3	2	1
04	280	2	1	4	1	2	1	1	4	2	2	1	1
04	281	1	1	4	1	4	1	1	3	3	2	1	1
04	282	1	5	3	4		2	1	2	3	2	2	2
04	283	2	3	4	3		2	1	2	3	2	1	1
04	284	2	5	1	2		1	1	1	1	2	2	2
04	285	2	4	3	2		3	1	3	1	2	1	1
04	286	1	4	3	1	3	5	1	3	1	2	1	1
04	287	2	3	3	2		4	1	3	2	2	1	1
04	288	1	4	2	1	3	3	1	2	3	1	1	1
04	289	1	4	3	4		4	1	3	2	2	1	1
04	290	1	2	3	1	3	4	1	4	2	2	1	1
04	291	2	4	1	2		1	1	3	3	2	2	2
04	292	2	2	3	2		4	1	4	3	2	1	1
04	293	1	4	2	1	3	3	1	5	2	2	1	1
04	294	2	4	1	2		1	1	3	1	2	1	1
04	295	2	5	1	2		1	1	2	1	1	1	1
04	296	1	5	2	1	4	1	1	3	4		2	2
04	297	2	4	4	2		4	1	4	1	2	1	1
04	298	2	3	3	2		4	1	3	1	2	1	1
04	299	2	2	3	2		3	1	4	3	2	1	1
04	300	2	5	4	2		1	1	3	3	1	1	1
04	301	2	4	1	2		1	1	4	1	3	1	1
04	302	2	4	4	2		4	1	3	1	2	1	1
04	303	2	2	3	2		1	1	2	3	2	1	1
04	304	1	2	2	1	3	2	1	2	3	2	1	1
04	305	2	4	2	2		1	1	3	4		1	1
04	306	1	1	4	1	1	3	1	3	1	2	1	1
04	307	1	1	3	1	3	2	1	3	2	2	1	1
04	308	2	1	4	3		1	1	3	2	2	1	1

Test Site Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
05001	1	3	4	1	3	4	1	3	1	2	1	1
05002	1	2	3	1	3	2	1	2	3	2	2	2
05003	1	1	3	1	2	2	1	4	2	2	1	1
05004	1	2	4	1	1	4	1	3	1	2	1	1
05005	1	2	4	1	1	3	1	2	2	1	2	1
05006	1	4	3	1	1	3	1	3	1	2	1	1
05007	1	4	3	4		4	1	3	1	1	2	2
05008	1	3	4	1	2	2	1	2	3	3	1	2
05009	2	3	3	2		3	1	3	2	2	1	1
05010	2	2	3	2		4	1	3	1	2	1	1
05011	2	3	5	1	1	4	1	2	2	3	2	1
05012	1	1	4	3		4	1	1	3	2	2	1
05013	1	1	3	5		4	1	3	2	2	2	1
05014	2	1	3	1	2	2	1	3	2	2	2	2
05015	2	2	3	2		1	1	2	3	2	1	1
05016	2	2	4	2		3	1	3	2	2	1	1
05017	2	2	3	2		4	1	3	2	2	1	1
05018	1	1	3	1	1	3	1	3	3	2	1	1
05019	2	3	3	1	2	3	1	3	3	2	1	1
05020	2	2	4	1	2	2	1	3	1	2	1	1
05021	2	4	1	2		2	1	3	3	1	1	1
05022	2	4	3	1	4	1	1	5	2	2	1	1
05023	2	3	5	2		5	1	3	3	2	1	1
05024	2	2	3	2		2	1	3	1	2	1	1
05025	2	3	1	1	3	2	1	2	3	3	2	2
05026	2	2	5	1	1	4	1	4	2	2	1	1
05027	2	2	4	4		2	1	5	1	3	1	1
05028	1	4	4	1	2	4	1	2	3	2	2	2
05029	2	3	3	2		4	1	3	2	2	1	1
05030	1	3	4	1	3	3	1	3	2	2	1	1
05031	1	1	4	3		1	1	2	2	2	1	1
05032	1	2	5	3		2	1	3	3	2	1	1
05033	1	2	5	3		1	1	3	3	3	1	1
05034	1	1	2	3		3	2					
05035	1	3	4	1	2	2	1	3	1	2	1	1
05036	2	1	3	2		1	1	4	2	2	1	1
05037	1	1	3	1	4	1	1	3	2	2	1	1
05038	1	4	5	1	1	5	1	3	1	2	1	1
05039	2	1	4	1	3	1	1	2	1	2	2	1
05040	2	3	4	2		4	1	4	1	2	1	1
05041	1	4	5	4		2	1	4	3	2	1	1
05042	1	1	4	1	4	1	1	2	1	2	1	1
05043	2	1	5	1	1	3	1	3	2	2	1	1
05044	1	3	4	1	2	3	1	3	1	2	1	1
05045	2	2	3	2		2	1	2	1	2	2	1
05046	2	3	3	2		4	1	3	3	3	1	1
05047	2	3	3	2		2	1	4	1	2	2	1
05048	2	2	4	2		1	1	2	1	3	2	2
05049	2	4	4	1	1	4	1	3	1	2	1	1
05050	2	2	4	1	4	4	1	4	2	2	1	1
05051	1	2	5	1	4	2	1	2	1	2	2	2
05052	1	3	5	1	1	4	1	3	2	3	1	1
05053	1	3	2	5		5	1	3	1	2	1	1
05054	1	3	3	5		2	1	3	2	2	1	1
05055	2	3	3	2		2	1	4	2	2	1	1
05056	2	4	4	2		2	1	1	3	2	2	2
05057	1	4	3	4		2	1	3	2	2	1	1
05058	2	4	2	2		3	1	3	3	2	1	1
05059	2	2	3	2		3	1	3	3	2	1	1
05060	2	4	3	2		4	1	3	1	2	1	1
05061	1	3	3	1	4	2	1	3	2	2	1	1
05062	2	3	3	1	3	2	1	3	3	1	1	1
05063	1	4	3	4		4	1	3	2	3	1	1
05064	1	2	3	1	1	3	1	3	3	2	1	1
05065	1	1	4	3		4	1	3	2	2	1	1
05066	2	1	3	2		4	1	2	2	2	1	1
05067	1	4	5	5		4	1	3	1	2	1	1
05068	1	1	2	3		3	1	2	3	2	2	1
05069	1	1	2	3		1	1	2	3	2	2	1
05070	1	1	2	3		3	1	2	2	2	2	1
05071	1	1	2	3		3	1	1	1	2	2	1
05072	1	1	2	1	4	5	1	1	2	2	2	1
05073	2	3	4	2		3	1	2	1	2	1	1
05074	2	4	4	1	2	4	1	2	1	2	2	1
05075	1	2	2	1	3	2	2					
05076	1	3	4	4		2	1	3	3	1	1	1
05077	2	5	1	2		1	1	2	3	2	2	1
05078	1	1	3	1	4	2	2					
05079	2	4	1	2		2	1	5	2	2	1	1
05080	2	2	4	2		2	1	5	2	2	1	1
05081	2	3	4	2		2	1	3	1	2	1	1
05082	2	2	4	2		3	1	3	1	2	1	1
05083	2	2	2	2		2	1	5	2	2	1	1
05084	1	5	1	4		1	1	1	3	3	2	2
05085	2	5	1	2		1	1	1	2	2	2	2
05086	1	1	5	1	1	2	1	3	2	2	1	1
05087	2	1	4	3		2	1	3	2	2	1	1
05088	2	4	2	5		1	1	4	1	2	2	1
05089	2	2	3	2		2	1	3	1	2	1	1
05090	1	2	3	1	4	2	1	3	1	2	1	1
05091	2	2	3	1	4	3	1	3	3	3	1	1
05092	2	2	5	3		4	1	4	2	2	1	1
05093	1	3	1	1	3	1	1	2	3	2	2	2
05094	1	5	1	4		1	1	1	2	3	2	2
05095	2	1	4	1	2	4	1	4	2	1	1	1
05096	1	2	4	1	1	3	1	3	2	2	1	1
05097	2	1	2	2		2	1	3	2	1	1	1
05098	2	1	2	3		1	1	4	2	2	1	1
05099	2	2	4	2		4	1	3	3	2	1	2
05100	1	1	4	1	4	2	1	2	3	3	2	1
05101	1	1	3	1	3	5	1	2	3	1	2	2
05102	1	1	3	1	2	1	1	2	2	2	2	2
05103	2	3	5	1	1	3	1	2	3	3	2	2
05104	2	4	4	2		4	1	4	1	2	1	1
05105	2	1	4	3		1	1	3	2	2	1	1
05106	2	1	2	2		1	1	1	2	2	2	2
05107	2	4	2	1	2	4	1	3	1	2	1	1
05108	2	2	2	1	1	1	1	1	4		1	1
05109	1	5	2	4		2	1	2	2	1	2	2

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
05	110	2	2	4	1	1	5	2					
05	111	1	4	3	1	1	2	1	2	1	1	1	1
05	112	2	4	4	1	1	3	1	4	2	2	1	1
05	113	2	4	4	2		5	1	3	2	2	2	1
05	114	1	4	4	4		4	1	4	1	2	1	1
05	115	2	1	4	1	2	1	1	3	2	2	1	1
05	116	1	1	3	1	4	2	2					
05	117	1	2	3	1	3	2	1	3	1	2	1	1
05	118	2	2	3	2		5	1	2	3	2	1	1
05	119	1	3	2	5		5	1	3	1	2	1	1
05	120	1	2	5	1	1	4	1	3	3	2	1	1
05	121	1	1	5	1	2	3	2					
05	122	1	3	4	1	4	2	1	3	2	3	1	1
05	123	1	1	4	1	3	1	1	3	3	3	1	1
05	124	2	3	2	2		3	1	3	1	2	1	1
05	125	1	2	5	1	1	5	1	1	3	2	2	2
05	126	1	4	4	1	4	4	1	2	3	1	1	1
05	127	2	3	2	2		5	1	2	1	2	1	1
05	128	2	2	3	2		4	1	3	2	2	1	1
05	129	2	2	4	1	2	2	1	2	2	2	2	2
05	130	1	2	4	1	3	5	2					
05	131	1	3	4	1	1	3	1	3	2	2	1	1
05	132	2	3	1	1	3	2	1	3	1	2	1	1
05	133	1	4	4	4		4	1	3	1	2	1	1
05	134	2	2	3	2		2	1	3	3	2	1	1
05	135	2	2	4	2		2	1	4	1	2	1	1
05	136	1	3	3	1	3	2	1	2	3	3	2	2
05	137	1	3	2	5		5	1	2	2	2	2	2
05	138	1	4	4	4		5	1	4	1	2	1	1
05	139	1	3	3	1	3	3	2					
05	140	1	4	4	4		2	1	2	3	3	2	2
05	141	1	3	1	5		1	1	2	1	3	1	1
05	142	2	2	3	2		3	1	2	3	2	2	1
05	143	2	4	4	2		5	1	2	1	3	2	2
05	144	1	5	1	4		1	1	2	1	2	2	2
05	145	2	2	3	2		2	1	2	3	1	2	2
05	146	1	3	1	1	4	1	1	2	3	3	2	2
05	147	1	4	3	1	3	3	1	4	1	2	1	1
05	148	2	2	5	2		2	1	3	3	2	1	1
05	149	1	2	4	1	3	3	2					
05	150	1	4	4	1	1	2	1	3	3	3	1	1
05	151	1	4	1	4		1	1	3	2	2	2	2
05	152	1	3	3	1	4	2	1	3	1	2	1	1
05	153	2	3	3	1	3	2	1	3	1	2	1	1
05	154	2	2	2	2		2	1	3	1	2	1	1
05	155	2	2	2	2		4	1	3	2	2	1	1
05	156	1	3	3	1	3	4	1	3	1	2	1	1
05	157	1	2	5	1	2	4	1	4	2	3	1	1
05	158	1	3	4	1	1	5	1	2	3	2	2	1
05	159	2	3	3	2		3	1	5	1	2	1	1
05	160	1	4	4	1	3	3	1	3	1	2	1	1
05	161	2	3	2	1	4	1	1	2	3	3	1	2
05	162	1	2	3	1	4	1	1	3	3	1	1	1
05	163	1	1	3	1	4	3	1	2	3	3	1	1
05	164	2	4	1	1	4	3	1	3	2	3	1	1
05	165	1	4	3	1	3	2	1	3	2	2	1	1
05	166	2	2	5	2		4	1	3	2	2	1	1
05	167	2	2	4	2		3	1	3	3	2	1	1
05	168	2	2	4	2		2	1	5	1	2	1	1
05	169	1	1	3	1	3	1	1	2	3	2	1	1
05	170	2	3	2	2		2	1	3	1	2	1	1
05	171	1	3	3	1	1	3	1	3	2	2	1	1
05	172	2	2	3	2		5	1	3	3	2	1	1
05	173	1	1	3	1	1	1	1	3	3	3	1	1
05	174	2	5	1	4		1	1	2	1	3	2	2
05	175	2	2	3	2		4	1	2	2	2	2	1
05	176	2	1	3	2		2	1	3	2	2	1	1
05	177	2	3	3	2		3	2					
05	178	1	1	3	5		2	2					
05	179	2	1	5	2		4	1	2	3	2	2	1
05	180	2	4	3	2		2	1	2	2	2	1	1
05	181	1	2	3	1	3	2	1	3	2	2	1	1
05	182	1	4	2	1	3	2	1	2	3	1	2	2
05	183	2	4	2	1	2	3	1	3	2	2	1	1
05	184	1	4	4	1	2	4	2					
05	185	1	2	5	3		1	1	2	3	2	1	1
05	186	1	1	2	3		1	1	2	1	3	2	1
05	187	2	3	5	2		4	1	4	1	2	1	1
05	188	1	1	4	3		1	1	2	2	3	1	1
05	189	2	3	3	2		4	1	2	3	2	2	2
05	190	1	4	4	1	3	3	1	2	3	1	2	2
05	191	2	4	1	2		1	2					
05	192	1	4	1	4		1	2					
05	193	2	4	3	2		4	1	2	2	3	2	2
05	194	2	4	4	2		5	1	2	2	3	2	2
05	195	2	2	2	2		3	1	2	2	2	2	2
05	196	1	5	2	5		1	1	2	1	2	2	2
05	197	2	1	4	1	3	3	1	2	3	2	2	2
05	198	1	4	2	4		4	1	2	1	2	1	1
05	199	2	3	5	1	1	4	2					
05	200	1	3	4	1	2	4	2					
05	201	1	4	4	4		3	1	2	2	1	2	2
05	202	2	1	3	2		2	1	3	3	2	1	1
05	203	1	2	4	1	1	3	1	2	3	2	2	2
05	204	2	2	3	2	2	3	1	3	3	2	1	1
05	205	1	3	4	1	4	3	2					
05	206	1	4	1	1	3	1	1	3	1	2	1	1
05	207	1	1	5	1	3	2	1	3	3	3	1	1
05	208	2	3	2	1	2	4	1	2	3	3	2	2
05	209	1	4	2	1	3	2	1	2	1	3	1	1
05	210	2	3	3	2		5	1	2	3	1	1	1
05	211	1	3	4	1	3	3	2					
05	212	2	2	3	2		4	1	2	1	2	2	1
05	213	1	1	2	3		1	1	2	2	1	2	1
05	214	1	1	4	3		3	1	3	2	2	1	1
05	215	1	2	4	3		2	1	3	1	2	1	1
05	216	2	1	3	1	2	1	1	2	3	3	2	1
05	217	1	3	2	1	3	1	1	4	1	2	1	1
05	218	2	4	4	2		4	1	2	3	2	2	1
05	219	2	2	4	2		2	1	3	3	2	2	1

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
05	220	2	4	5	1	1	4	1	2	3	3	2	2
05	221	2	2	3	1	2	4	1	2	4		2	2
05	222	2	3	2	2		3	1	3	3	2	1	1
05	223	2	4	2	2		3	1	2	3	2	2	2
05	224	2	5	1	4		1	2					
05	225	2	2	4	2		4	1	3	2	2	1	1
05	226	2	4	3	1	4	2	1	3	2	2	1	1
05	227	2	3	3	1	4	3	1	2	1	3	1	1
05	228	2	3	3	2		3	1	2	2	2	1	1
05	229	2	3	3	1	2	2	1	2	2	2	1	1
05	230	2	5	2	2		1	1	2	4		1	1
05	231	2	3	5	2		4	1	2	3	3	2	2
05	232	2	4	1	2		5	1	3	1	1	1	1
05	233	1	1	5	1	1	3	1	3	2	2	2	1
05	234	2	1	3	2		1	1	3	2	2	2	2
05	235	1	4	4	1	4	4	1	2	2	2	2	2
05	236	2	4	3	2		4	1	3	1	2	1	1
05	237	1	2	4	1	1	4	2					
05	238	1	1	5	1	1	2	1	3	2	2	1	1
05	239	2	3	1	2		2	1	2	1	2	2	1
05	240	1	5	1	4		1	1	2	4		1	1
05	241	2	4	3	2		4	1	3	2	3	1	1
05	242	2	1	1	2		3	1	4	4		1	1
05	243	2	1	4	3		2	1	5	3	2	1	1
05	244	2	2	3	1	1	4	1	1	3	2	2	1
05	245	2	3	5	2		5	1	2	3	3	2	1
05	246	1	1	2	3		3	1	1	4		2	1
05	247	1	4	4	1	2	2	1	2	3	3	2	1
05	248	2	2	4	2		3	1	3	2	2	1	1
05	249	2	2	3	2		2	1	3	1	2	1	1
05	250	1	3	4	1	2	4	1	2	3	2	2	1
05	251	1	1	2	1	3	1	2					
05	252	1	3	4	1	1	4	1	2	3	3	2	2
05	253	1	5	5	4		5	1	2	1	2	2	2
05	254	2	1	5	1	2	2	1	3	1	2	1	1
05	255	2	1	4	1	2	4	2					
05	256	1	3	3	1	3	4	2					
05	257	1	3	4	1	1	3	1	3	1	2	2	1
05	258	2	3	4	1	1	4	1	3	2	3	1	1
05	259	2	5	5	4		2	1	3	2	2	1	1
05	260	2	3	4	2		2	1	2	3	2	2	1
05	261	2	3	3	2		4	1	2	4		1	1
05	262	2	1	2	3		2	1	2	1	1	2	2
05	263	2	1	3	1	2	2	1	2	1	1	2	2
05	264	2	5	3	2		5	1	3	1	2	1	1
05	265	2	4	4	1	1	4	1	3	1	2	1	1
05	266	1	1	4	1	1	2	1	1	3	2	2	2
05	267	1	1	3	1	3	2	1	2	2	2	2	1
05	268	1	1	3	1	3	2	1	2	4		2	2
05	269	2	1	3	2		2	1	3	2	2	1	1
05	270	1	2	5	1	1	3	1	3	3	2	1	1
05	271	1	3	4	4		2	1	3	1	2	1	1
05	272	1	4	3	4		4	2					
05	273	1	3	3	1	1	2	2					
05	274	1	2	4	1	3	2	1	1	4		2	2
05	275	1	2	3	1	4	1	1	2	3	3	1	1
05	276	1	3	3	1	3	4	2					
05	277	2	1	4	3		4	1	2	2	2	1	1
05	278	1	3	3	1	1	4	1	2	3	3	2	1
05	279	2	5	2	2		1	2					
05	280	1	1	3	1	3	2	1	2	3	2	1	1
05	281	1	4	4	4		3	1	3	2	2	1	1
05	282	2	2	3	2		5	1	3	2	2	1	1
05	283	2	1	2	3		5	1	3	2	1	1	1
05	284	2	2	2	2		2	1	2	4		1	1
05	285	2	1	4	2		2	1	3	2	2	1	1
05	286	2	1	3	1	2	3	1	1	2	2	2	2
05	287	2	1	2	3		3	1	3	3	3	1	1
05	288	1	1	3	1	1	2	1	3	2	2	1	1
05	289	1	1	3	3		2	1	3	3	2	1	1
05	290	2	2	4	1	1	2	1	4	2	2	1	1
05	291	1	1	3	1	4	2	1	3	1	2	2	1
05	292	1	2	3	1	4	2	1	2	2	3	1	1
05	293	2	3	2	1	2	1	1	1	4		2	2
05	294	2	1	2	3		4	1	2	3	3	2	1
05	295	2	1	2	3		4	1	3	1	2	1	1
05	296	1	3	3	1	3	2	1	3	2	1	1	1
05	297	2	2	5	1	1	4	1	3	1	2	1	1
05	298	2	2	1	2		1	1	1	1	3	1	2
05	299	2	1	2	1	2	4	2					
05	300	2	4	2	2		1	1	3	1	2	1	1
05	301	2	1	3	2		2	1	3	2	2	2	1
05	302	1	2	3	1	3	3	1	1	4		2	2
05	303	1	3	2	1	4	3	2					
05	304	1	2	4	1	3	2	1	2	1	2	2	2
05	305	2	4	2	2		2	1	2	1	3	1	1
05	306	2	2	3	2		3	1	2	3	3	2	2
05	307	1	2	3	1	4	2	1	3	2	2	1	1
05	308	2	1	2	3		2	1	3	3	3	1	1
05	309	2	1	2	3		3	1	2	3	2	1	1
05	310	2	1	2	3		2	1	2	3	2	2	1
05	311	2	1	2	3		2	1	2	1	2	2	1
05	312	2	1	2	3		4	1	2	3	2	2	1
05	313	2	4	4	1	2	2	2					
05	314	2	1	5	1	2	3	1	3	2	2	1	1
05	315	1	2	3	1	3	4	1	2	3	2	1	1
05	316	2	2	2	2		4	2					
05	317	2	1	2	3		3	1	2	2	2	1	1
05	318	2	1	2	1	4	3	1	4	3	2	1	1
05	319	2	2	4	2		4	1	3	1	2	1	1
05	320	2	3	4	2		4	1	3	3	2	1	1
05	321	1	2	5	1	1	3	2					
05	322	1	1	5	1	4	2	2					
05	323	1	4	5	1	4	3	1	3	1	2	1	1
05	324	2	3	2	2		3	2					
05	325	1	1	4	1	4	1	1	2	3	2	2	2
05	326	1	4	4	1	1	3	2					
05	327	1	3	4	1	1	4	1	4	1	2	1	1
05	328	1	3	3	1	2	5	1	3	2	2	1	1
05	329	1	4	1	4		1	1	2	3	2	2	1

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
05	330	1	2	4	1	4	3	1	3	1	3	1	1
05	331	2	3	3	1	2	4	2					
05	332	1	1	2	3		3	1	2	3	2	1	1
05	333	2	4	3	2		3	1	3	1	3	1	1
05	334	2	4	4	2		3	1	3	1	2	1	1
05	335	2	3	3	2		3	1	4	2	2	1	1
05	336	2	1	2	3		3	1	5	3	2	1	1
05	337	2	3	2	2		2	1	4	1	2	1	1
05	338	2	1	2	3		3	1	4	1	2	1	1
05	339	1	4	4	1	2	4	2					
05	340	1	1	2	3		4	1	2	4		2	2
05	341	1	1	2	3		4	2					
05	342	1	1	3	1	1	3	1	3	2	3	1	1
05	343	2	2	3	1	4	4	1	3	2	2	1	1
05	344	1	3	3	1	4	4	1	3	2	2	1	1
05	345	2	2	4	2		2	1	4	1	2	1	1
05	346	2	4	3	2		3	1	3	3	2	1	1
05	347	1	1	1	1	3	1	1	1	4		2	1
05	348	1	3	1	1	3	1	1	1	4		1	1
05	349	1	4	3	1	3	1	1	3	3	1	1	1
05	350	1	1	2	1	3	1	2					
05	351	1	2	1	1	3	1	2					
05	352	1	1	2	1	3	2	1	2	2	2	1	1
05	353	1	1	2	1	4	2	1	3	3	2	1	1
05	354	1	2	2	1	4	2	1	1	2	2	2	2
05	355	1	2	2	1	3	1	2					
05	356	2	2	5	2		3	1	2	3	2	1	1
05	357	2	3	5	1	1	2	1	2	3	2	1	1
05	358	2	3	2	2		3	2					
05	359	2	2	5	2		4	2					
05	360	1	1	2	3		2	1	1	1	2	2	2
05	361	1	1	2	3		4	1	2	3	2	2	1
05	362	1	1	2	3		2	1	2	3	2	2	2
05	363	2	2	4	2		5	1	4	1	2	1	1
05	364	2	5	3	2		2	1	2	2	2	2	2
05	365	1	2	3	1	3	2	1	3	2	2	1	1
05	366	1	5	2	4		2	1	2	2	2	2	2
05	367	1	4	4	1	3	3	1	3	1	2	1	1
05	368	1	2	2	1	3	4	1	2	3	1	2	2
05	369	1	1	3	1	3	1	1	2	2	2	1	1
05	370	1	4	2	1	3	2	1	2	1	2	2	2
05	371	1	3	3	1	1	4	2					
05	372	1	2	5	1	2	4	1	2	2	2	2	1
05	373	1	4	1	4		4	1	3	3	2	2	1
05	374	2	1	5	3		5	1	3	2	2	1	1
05	375	2	1	4	2		3	1	3	2	2	1	1
05	376	1	1	2	3		4	1	2	2	2	1	1
05	377	1	1	2	3		4	1	2	1	2	1	1
05	378	1	2	5	1	2	3	1	3	1	2	1	1
05	379	2	2	3	2		2	1	3	2	2	2	1
05	380	2	2	1	2		1	1	2	4		2	2
05	381	2	1	2	3		3	1	3	2	2	1	1
05	382	2	1	2	3		3	1	3	2	2	1	1
05	383	1	1	3	1	4	3	1	3	2	2	1	1
05	384	1	1	2	3		5	1	2	3	2	2	2
05	385	2	1	4	2		3	1	2	2	1	2	1
05	386	2	2	4	2		3	1	3	4		1	1
05	387	1	3	4	1	1	4	1	2	2	3	1	1
05	388	2	1	2	3		2	1	2	3	2	2	2
05	389	1	3	4	1	1	4	1	2	3	2	2	2
05	390	2	1	2	5		3	1	2	3	2	1	1
05	391	2	3	2	2		3	1	2	3	2	2	2
05	392	1	2	4	1	1	2	1	3	3	3	1	1
05	393	1	2	4	1	4	2	1	3	2	2	1	1
05	394	1	2	4	1	4	2	1	3	1	2	1	1
05	395	2	1	3	3		2	1	1	3	3	2	2
05	396	2	3	3	2		4	1	3	1	3	1	1
05	397	2	3	4	1	2	3	1	3	3	3	1	1
05	398	2	3	4	1	1	3	1	3	2	2	1	1
05	399	2	3	4	2		4	1	2	3	2	2	2
05	400	2	3	3	2		1	1	3	2	3	1	1
05	401	1	2	5	1	1	3	1	3	2	2	1	1
05	402	2	2	3	2		3	1	3	3	2	1	1
05	403	2	2	4	2		3	1	3	2	2	1	1
05	404	1	4	3	1	2	4	1	2	4		2	2
05	405	2	1	3	2		1	1	1	4		2	2
05	406	1	4	4	1	1	3	2					
05	407	1	2	3	1	3	3	1	3	3	3	1	1
05	408	2	2	3	2		3	1	3	2	1	1	1
05	409	2	1	4	3		2	1	3	2	2	1	1
05	410	2	1	2	3		2	2					
05	411	2	1	2	2		2	1	2	2	2	1	1
05	412	2	1	3	3		1	1	1	3	1	1	1
05	413	2	3	4	2		3	1	3	1	2	1	1
05	414	2	2	4	2		2	2		4		1	1

Test Site Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
06001	1	2	4	1	2	3	1	3	3	1	1	1
06002	2	1	2	3		3	1	2	3	1	1	2
06003	2	3	4	5		5	1	3	3	2	1	1
06004	1	4	3	1	3	4	1	2	3	2	1	1
06005	2	4	1	2		1	2					
06006	2	4	1	5		1	1	2	4		2	2
06007	1	1	3	1	3	3	1	2	3	2	1	1
06008	1	1	4	1	3	3	1	2	3	2	2	2
06009	2	4	4	2		3	1	3	1	3	1	1
06010	2	1	5	1	1	3	1	3	2	3	1	1
06011	2	4	2	2	3	2	1	2	4		2	2
06012	1	2	5	1	1	2	1	2	3	1	2	1
06013	2	1	5	1	1	2	2					
06014	2	4	3	2		2	2					
06015	2	4	3	2		1	2					
06016	2	1	4	3		2	2					
06017	2	3	3	2		4	2					
06018	1	5	1	1	3	2	1	1	2	1	2	2
06019	2	1	3	5		2	1	3	3	2	1	1
06020	2	3	3	1	2	4	1	4	1	2	1	1
06021	1	4	3	1	1	4	1	2	1	2	1	1
06022	1	3	5	1	1	5	2					
06023	2	3	4	2		5	1	3	2	2	1	1
06024	1	4	3	4		3	2					
06025	2	3	3	2		3	1	2	1	2	2	2
06026	2	2	2	2		4	1	3	3	2	1	1
06027	2	4	2	2		4	1	3	1	2	1	1
06028	2	4	1	1	2	3	2					
06029	1	4	1	1	3	3	2					
06030	1	5	3	4		4	1	3	1	2	1	1
06031	1	3	4	1	4	3	2					
06032	2	1	2	3		1	1	2	2	2	1	1
06033	2	2	2	2		2	1	4	1	3	1	1
06034	2	3	3	2		4	1	2	3	2	2	2
06035	1	3	5	1	3	4	1	2	3	3	2	2
06036	1	4	1	1	3	1	2					
06037	2	1	3	2		2	1	2	3	2	2	2
06038	2	4	3	1	3	2	2					
06039	1	3	3	1	3	4	2					
06040	2	3	1	2		2	1	2	3	1	2	1
06041	1	3	3	1	3	1	1	3	3	3	1	1
06042	2	4	1	2		3	1	2	1	2	1	1
06043	2	3	3	2		2	1	3	2	2	1	1
06044	2	5	1	4		1	2					
06045	2	4	1	1	2	1	2					
06046	2	4	2	1		2	2					
06047	1	3	3	1	4	4	1	2	1	2	2	1
06048	2	2	5	1	1	4	1	3	2	2	1	1
06049	1	2	5	1	1	5	2					
06050	2	2	1	2		1	2					
06051	1	5	1	4		1	2					
06052	1	3	2	1	3	2	2					
06053	2	5	1	4		1	1	2	4		2	2
06054	1	3	4	1	1	4	1	3	2	2	2	1
06055	1	4	3	1	3	5	2					
06056	2	4	4	1	3	5	1	2	3	2	2	2
06057	1	4	5	1	1	5	2					
06058	1	1	3	3		2	1	3	3	2	1	1
06059	1	3	5	1	1	5	2					
06060	1	1	3	1	4	2	2					
06061	2	1	4	1	2	2	2					
06062	2	3	3	2		3	2					
06063	2	3	4	1	2	3	1	3	3	2	1	1
06064	1	3	3	1	3	3	2					
06065	2	4	3	2		2	1	4	1	2	1	1
06066	1	5	3	4		3	1	4	1	3	1	1
06067	2	1	3	1	2	2	1	2	4		2	1
06068	2	1	4	1	2	2	2					
06069	1	5	2	4		2	2					
06070	2	4	4	2		4	1	2	3	2	2	1
06071	2	1	4	3		2	2					
06072	2	5	3	4		4	1	2	3	1	2	1
06073	2	3	2	1	4	1	1	1	3	1	1	2
06074	1	4	4	1	3	2	1	1	3	1	2	2
06075	1	1	4	3		2	1	2	3	3	1	1
06076	1	1	4	3		1	1	2	2	2	1	1
06077	2	2	3	2		1	1	2	3	3	1	1
06078	1	2	3	1	4	2	1	2	3	2	1	1
06079	1	4	1	1	3	1	1	2	4		2	2
06080	2	3	4	1	2	3	1	4	2	2	1	1
06081	2	2	3	2		1	1	2	2	2	2	1
06082	2	4	1	1	2	2	2					
06083	2	2	5	1	2	4	1	3	3	3	1	1
06084	1	2	4	1	2	3	1	2	3	3	2	2
06085	1	4	2	4		2	2					
06086	1	3	4	1	2	3	1	4	2	2	1	1
06087	1	1	5	3		4	2					
06088	1	5	1	4		2	2					
06089	1	2	2	1	4	2	1	3	2	2	1	1
06090	2	2	3	1	2	3	1	3	3	2	1	1
06091	1	2	4	1	3	2	1	2	3	2	2	2
06092	2	3	1	2		1	2					
06093	2	4	1	2		1	2					
06094	2	3	2	1	4	3	1	3	3	2	1	1
06095	2	3	3	2		2	1	1	4		2	2
06096	2	4	3	1	2	3	1	1	3	3	2	2
06097	1	4	4	1	1	4	1	2	3	1	2	2
06098	1	5	4	4		2	2					
06099	2	3	4	1	2	5	1	2	3	1	2	2
06100	2	4	4	1	1	2	1	3	1	2	1	1
06101	2	1	3	2		3	1	2	2	2	1	1
06102	1	2	3	1	3	3	2					
06103	1	5	1	4		1	2					
06104	2	3	3	2		4	1	3	3	2	1	1
06105	1	3	3	1	2	4	2					
06106	2	2	2	2		1	2					
06107	1	2	4	1	3	2	1	3	2	2	1	1
06108	2	3	4	2		3	1	3	2	2	1	1
06109	2	1	3	1	4	5	1	2	3	3	2	2
06110	2	1	4	3		2	1	3	3	3	1	1

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
06111		2	1	4	2		3	1	2	3	2	1	1
06112		1	5	1	4		1	1	3	1	2	1	1
06113		2	5	2	2		1	1	3	2	2	1	1
06114		1	3	3	5		3	1	2	3	1	1	1
06115		1	3	4	1	4	3	1	3	3	1	1	1
06116		2	2	4	2		3	1	3	3	2	1	1
06117		2	2	1	2		2	2					
06118		1	5	1	4		1	2					
06119		1	1	2	1	4	2	1	2	4		2	2
06120		2	2	1	2		1	2					
06121		2	4	1	2		2	1	2	3	2	2	2
06122		2	1	3	1	2	3	1	2	2	3	2	2
06123		1	4	3	1	2	4	2					
06124		1	4	2	1	1	3	2					
06125		1	5	2	4		2	2					
06126		2	5	1	2		1	2					
06127		1	4	5	1	1	3	2					
06128		2	1	1	2		1	2					
06129		2	2	4	1	1	4	1	3	3	1	1	1
06130		1	2	3	1	1	2	1	2	1	2	2	1
06131		2	1	4	2		5	2					
06132		1	1	3	1	3	2	1	3	2	2	1	1
06133		1	4	4	1	3	2	2					
06134		1	4	1	1	4	2	2					
06135		2	3	4	2		4	2					
06136		2	2	3	2		2	1	2	2	1	2	2
06137		1	4	2	4		1	1	3	3	2	1	1
06138		2	4	1	4		1	1	3	3	2	1	1
06139		1	1	3	1	4	2	1	2	3	2	2	1
06140		2	1	4	1	2	2	1	2	3	1	2	2
06141		2	1	3	2		4	2					
06142		1	1	4	1	2	1	1	2	2	2	1	1
06143		1	2	3	3		2	1	1	4		1	1
06144		1	2	4	3		2	1	2	4		1	1
06145		2	1	3	5		2	1	2	3	2	2	2
06146		1	1	2	5		1	2					
06147		1	2	4	1	2	2	1	3	3	2	1	1
06148		1	2	3	1	2	3	1	1	4		2	1
06149		2	2	4	2		2	1	3	3	2	1	1
06150		1	2	4	1	1	4	1	3	4		1	1
06151		2	2	5	2		3	1	2	3	3	1	1
06152		1	4	1	1	3	3	1	1	4		2	2
06153		1	2	4	1	1	4	2					
06154		2	3	3	1	2	4	2					
06155		1	3	5	1	1	5	1	2	3	3	2	2
06156		2	2	5	1	1	3	1	3	1	2	1	1
06157		2	1	4	1	2	2	1	3	2	2	2	1
06158		1	1	2	1	3	2	2					
06159		1	4	3	1	3	4	2					
06160		1	5	5	1	1	4	2					
06161		1	2	5	1	1	2	1	3	2	2	1	1
06162		2	2	5	1	1	4	2					
06163		2	2	4	2		4	2					
06164		1	2	4	1	2	2	1	3	3	2	1	1
06165		1	3	1	1	4	1	1	1	3	1	2	2
06166		2	1	3	1	2	2	1	3	3	2	1	1
06167		1	1	3	1	3	2	1	2	3	2	2	2
06168		2	4	2	1	2	2	2					
06169		2	5	1	4		1	2					
06170		2	5	1	2		1	2					
06171		2	1	3	2		2	2					
06172		2	2	2	1	2	2	1	1	2	1	2	2
06173		2	5	2	2	2	1	1	3	3	2	1	1
06174		1	2	4	1	2	3	2					
06175		1	3	3	1	2	3	1	1	3	2	2	1
06176		2	3	3	2		3	2					
06177		1	2	4	1	3	2	1	2	3	2	2	1
06178		1	5	1	4		1	2					
06179		2	3	4	2		4	1	2	4		2	2
06180		2	5	2	2		1	2					
06181		1	1	4	3		3	1	3	3	3	1	1
06182		2	1	4	1	2	1	2					
06183		1	1	2	1	3	1	1	1	4			
06184		2	3	2	2		3	2					
06185		2	3	3	1	3	2	2					
06186		1	1	3	1	3	1	1	2	3	1	2	2
06187		1	1	4	1	3	1	1	2	3	1	1	1
06188		1	3	4	1	3	3	2					
06189		1	1	3	1	3	2	1	1	4		2	2
06190		2	3	2	2		4	1	1	3	1	2	2
06191		2	4	5	2		3	1	2	1	3	2	2
06192		2	2	5	1	1	2	1	2	3	1	2	2
06193		1	2	4	1	1	3	2					
06194		2	2	4	2		3	2					
06195		2	4	4	1	2	2	2					
06196		1	2	5	1	1	5	2					
06197		1	2	5	1	1	4	1	1	4		2	2
06198		2	3	4	1	1	5	2					
06199		1	3	2	1	3	3	1	2	2	2	2	2
06200		1	1	3	1	3	2	1	1	3	3	2	1
06201		2	2	4	2		3	1	3	1	1	1	1
06202		2	5	1	2		2	1	[illegible]		2	1	1
06203		2	2	3	1	4	3	2					
06204		2	2	3	1	4	2	1	3	4		1	1
06205		2	1	3	2		1	1	2	3	2	1	1
06206		1	5	1	4		1	1	1	2	2	1	1
06207		1	3	2	4		3	1	3	1	3	1	1
06208		2	2	2	2		3	1	2	2	2	1	1
06209		1	5	1	4		1	1	3	2	2	1	1
06210		2	4	2	2		1	1	3	2	2	1	1
06211		2	3	2	2		3	1	2	3	3	2	1
06212		1	1	2	5		4	1	2	3	2	2	1
06213		1	1	2	5		3	1	2	3	2	2	1
06214		1	4	1	1	3	2	1	3	3	3	2	1
06215		2	4	3	2		4	2					
06216		1	4	4	4		4	2					
06217		1	3	3	1	3	1	1	2	3	2	2	1
06218		1	3	2	1	3	4	2					
06219		2	4	2	2		2	2					
06220		2	3	4	2		3	1	2	2	3	2	2

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
06	221	2	1	2	1	4	1	1	1	4		2	2
06	222	1	4	1	4		2	2					
06	223	2	5	4	4		2	2					
06	224	1	4	2	4		1	1	2	3	3	2	2
06	225	1	2	4	3		2	1	2	3	3	2	2
06	226	2	4	3	4		3	2					
06	227	2	3	3	1	2	4	2					
06	228	1	4	2	1	3	3	1	4	3	2	1	1
06	229	2	5	1	4		1	1	2	3	3	2	2
06	230	1	4	4	1	1	5	2					
06	231	2	1	2	2		3	2					
06	232	2	1	2	3		2	1	3	3	2	1	1
06	233	2	3	3	2		2	1	3	1	2	1	1
06	234	1	4	3	4		3	2					
06	235	2	3	1	2		2	1	2	3	1	2	2
06	236	2	2	3	1	2	4	1	2	3	2	1	1
06	237	2	2	3	1	4	2	1	3	3	3	1	1
06	238	2	2	2	2		2	1	1	4		2	2
06	239	2	3	2	2		4	2					
06	240	1	2	4	1	3	2	1	3	3	2	1	1
06	241	2	1	3	1	1	2	1	2	3	3	1	2
06	242	1	1	3	1	1	4	1	2	3	2	2	2
06	243	2	1	4	1	2	1	1	2	1	2	2	1
06	244	2	1	2	2		2	2					
06	245	2	3	2	2		3	1	2	4		1	1
06	246	1	3	3	1	3	3	2					
06	247	1	2	3	1	3	2	2					
06	248	1	3	2	1	1	1	1	1	3	2	2	2
06	249	2	1	4	2		2	1	2	3	3	1	1
06	250	2	2	3	2		2	1	2	3	1	1	1
06	251	1	4	2	1	3	2	2					
06	252	2	4	3	1	1	5	2					
06	253	2	4	3	1	2	3	2					
06	254	1	1	2	5		4	2					
06	255	1	1	3	1	4	2	1	3	3	2	1	1
06	256	1	2	1	1	3	2	1	4	1	2	1	1
06	257	2	2	1	2		2	1	4	2	2	1	1
06	258	2	4	3	2		3	1	2	2	1	2	2
06	259	2	5	1	4		1	1	2	4		2	2
06	260	2	3	2	2		3	1	2	4		2	2
06	261	1	3	4	1	1	4	2					
06	262	1	4	3	1	2	3	1	2	4		2	2
06	263	2	2	2	2		2	1	2	3	3	2	2
06	264	1	2	3	1	3	2	1	3	2	2	1	1
06	265	2	2	4	2		4	1	2	3	2	2	2
06	266	2	4	3	2		1	1	2	1	2	1	1
06	267	1	5	1	1	1	1	1	2	2	2	1	1
06	268	2	4	3	4		2	1	2	2	2	1	1
06	269	1	2	4	1	3	2	1	1	3	3	2	2
06	270	1	1	3	1	3	2	1	2	3	3	2	2
06	271	2	1	2	2		2	2					
06	272	1	4	3	4		1	2					
06	273	2	2	3	1	3	1	2					
06	274	2	2	2	1	2	1	2					
06	275	2	3	3	2		5	1	2	3	3	1	1
06	276	2	4	2	1	3	1	2					
06	277	2	4	2	1	2	1	2					
06	278	2	2	3	1	2	3	1	2	3	2	1	1
06	279	2	2	4	2		3	1	1	3	1	2	2
06	280	1	2	3	1	2	3	1	3	3	2	1	1
06	281	2	2	1	2		1	2					
06	282	1	1	3	1	3	2	1	1	1	3	2	1
06	283	1	3	4	1	3	4	1	1	2	2	2	1
06	284	2	2	3	1	1	5	1	2	1	3	2	2
06	285	1	1	2	1	1	3	2					
06	286	1	1	2	1	4	1	2					
06	287	1	2	4	1	2	2	1	3	2	2	1	1
06	288	2	2	4	2		5	2					
06	289	2	3	2	2		1	2					
06	290	2	4	2	1	4	1	1	3	1	2	1	1
06	291	2	3	4	2		3	1	3	3	2	1	1
06	292	2	3	1	2		1	1	3	3	2	1	1
06	293	2	2	2	2		3	1	3	2	3	2	1
06	294	2	2	4	1	2	3	1	3	3	3	1	1
06	295	2	1	3	2		3	2					
06	296	1	4	5	1	1	5	1	3	3	3	1	1
06	297	2	4	4	2		4	2					
06	298	2	1	4	3		4	1	2	3	2	2	2
06	299	2	1	4	3		4	1	3	3	2	1	1
06	300	1	5	1	4		1	1	2	4		2	2
06	301	2	1	5	1	1	4	1	3	3	3	1	1
06	302	1	5	2	4		1	2					
06	303	2	1	3	3		2	1	2	1	2	1	2
06	304	2	1	3	3		2	1	2	4		2	2
06	305	2	4	3	2		2	2					
06	306	2	4	3	2		4	2					
06	307	2	4	3	2		4	2					
06	308	2	4	3	2		4	1	3	2	2	1	1
06	309	1	1	3	3		5	1	2	3	2	1	1
06	310	2	4	3	1	1	4	1	3	1	1	1	1
06	311	1	4	2	1	1	4	1	3	2	3	1	1
06	312	2	4	2	2		3	1	4	3	2	1	1
06	313	1	1	4	3		3	1	2	2	2	2	1
06	314	1	1	4	3		3	1	2	2	3	2	2
06	315	2	2	4	2		2	1	3	3	2	1	1
06	316	2	2	2	2		2	1	2	3	2	2	2
06	317	2	2	2	2		3	1	3	2	2	2	1
06	318	1	2	3	1	1	3	1	3	3	3	1	1
06	319	1	1	3	1	2	2	1	4	2	3	2	1
06	320	2	1	3	2		1	1	2	1	2	2	1
06	321	2	3	3	2		3	1	3	2	2	1	1
06	322	2	4	3	2		4	1	2	3	1	2	2
06	323	1	1	4	3		3	1	2	3	2	1	1
06	324	2	1	4	3		3	2					
06	325	2	3	4	2		3	1	2	3	1	2	2
06	326	2	4	2	2		4	1	2	3	1	2	1
06	327	1	5	5	4		1	1	2	3	1	1	1
06	328	2	4	3	2		5	1	2	3	1	1	1
06	329	1	2	2	1	1	4	2					
06	330	2	1	2	1	2	1	1	2	4		1	1

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
06	331	2	1	3	1	2	1	1	2	4		1	1
06	332	2	5	3	2		1	1	2	3	2	2	2
06	333	1	1	4	1	3	1	1	3	3	2	1	1
06	334	1	1	4	3		1	1	2	1	2	1	1
06	335	2	5	3	2		1	2					
06	336	1	2	4	1	1	4	2					
06	337	1	5	1	4		5	1	3	2	2	1	1
06	338	1	3	1	1	3	1	1	2	3	2	2	2
06	339	1	4	5	1	1	5	1	2	1	2	2	2
06	340	1	2	2	1	3	3	2					
06	341	1	1	2	3		5	2					
06	342	1	1	5	1	4	1	2					
06	343	1	1	5	1	4	1	1	3	2	2	1	1
06	344	1	1	4	1	3	4	1	2	3	2	1	1
06	345	1	3	1	1	3	2	2					
06	346	1	3	3	1	3	4	1	2	3	2	2	2
06	347	1	2	3	1	3	2	2					
06	348	1	2	4	1	3	4	2					
06	349	2	2	3	1	2	2	2					
06	350	1	2	4	1	3	2	2					
06	351	2	5	2	4		1	2					
06	352	2	4	4	2		3	1	2	3	1	2	2
06	353	1	3	1	1	4	1	2					
06	354	1	3	4	1	3	2	2					
06	355	2	3	2	2		2	2					
06	356	1	1	3	1	3	2	2					
06	357	2	3	2	1	4	1	2					
06	358	1	4	1	5			2					
06	359	1	4	5	1	1	3	2					
06	360	2	4	2	2		4	1	2	1	3	2	2
06	361	1	5	4	4		4	1	2	3	2	2	2
06	362	2	1	3	2		2	1	3	2	2	1	1
06	363	1	1	4	1	3	1	1	2	3	1	1	1
06	364	2	4	2	1	3	3	2					
06	365	1	3	1	1	3	1	2					
06	366	2	1	2	2		3	1	2	2	2	1	1
06	367	1	2	2	1	3	3	2					
06	368	1	2	4	1	3	2	2					
06	369	1	2	2	1	1	5	2					
06	370	2	4	4	2		4	1	3	1	2	1	1
06	371	1	4	5	1	1	4	1	3	2	2	1	1
06	372	2	4	3	2		4	2					
06	373	2	2	4	2		3	1	3	3	2	1	1
06	374	1	4	2	1	3	2	1	1	2	2	2	1
06	375	1	1	3	1	1	2	1	2	3	2	1	1
06	376	2	2	4	2		3	1	2	3	1	2	2
06	377	2	2	3	2		2	1	3	1	1	1	1
06	378	1	1	3	1	3	3	1	3	3	1	2	1
06	379	2	2	2	2		3	2					
06	380	1	3	1	5		1	1	2	4		2	2
06	381	1	4	5	1	1	5	1	2	3	2	2	2
06	382	2	5	2	2		1	1	1	2	2	2	2
06	383	2	4	4	1	2	2	2					
06	384	2	2	4	2		2	2					
06	385	2	2	5	2		1	1	2	3	3	1	1
06	386	1	2	5	1	3	1	2					
06	387	1	4	4	1	3	3	1	2	3	1	2	1
06	388	2	1	4	1	2	1	1	2	4		2	1
06	389	2	4	3	2		1	1	2	4		2	1
06	390	2	4	3	2		2	2					
06	391	1	4	2	1	3	3	2					
06	392	1	1	4	3		1	2					
06	393	1	1	3	1	3	2	1	3	3	2	1	1
06	394	2	5	2	2		1	2					
06	395	2	5	3	2		2	2					
06	396	1	1	3	3		1	2					
06	397	2	3	4	2		5	1	1	3	3	2	2
06	398	1	3	3	1	3	3	2					
06	399	2	4	3	2		4	2					
06	400	1	4	5	1	3	5	1	1	3	2	2	2
06	401	1	5	1	4		1	1	4	4		1	1
06	402	2	1	2	2		2	1	2	3	3	1	1
06	403	2	1	2	2		1	1	2	1	2	1	1
06	404	1	2	3	1	4	3	2					
06	405	1	1	3	1	3	1	2					
06	406	2	1	4	1	1	2	2					
06	407	2	1	3	2		1	2					
06	408	2	2	2	2		3	1	3	3	2	2	2
06	409	2	2	3	1	4	1	2					
06	410	1	3	4	1	1	4	1	4	3	3	1	2
06	411	1	4	3	1	3	3	2					
06	412	2	2	3	2		2	1	2	4		2	1
06	413	1	2	3	1	3	3	1	4	3	3	2	1
06	414	1	2	3	1	3	2	1	3	3	2	1	1
06	415	2	1	2	2		2	2					
06	416	2	3	4	2		4	2					
06	417	1	3	4	1	1	4	1	2	4		1	1
06	418	2	1	3	1	2	2	1	1	4		2	2
06	419	1	3	2	1	4	2	2					
06	420	2	2	2	2		2	1	2	3	2	2	2
06	421	1	1	4	1	4	4	1	3	2	2	1	1
06	422	1	1	4	1	1	2	1	2	2	2	1	1
06	423	2	4	1	2		1	2					
06	424	1	4	1	1	3	2	2					
06	425	1	5	2	4		2	2					
06	426	2	3	5	2		5	2					
06	427	2	4	3	2		4	1	3	2	2	1	1
06	428	2	1	2	2		1	1	4	1	2	1	1
06	429	1	1	3	1	3	1	1	4	3	2	1	1
06	430	1	1	3	1	3	2	2					
06	431	1	1	2	1	3	2	2					
06	432	2	1	2	2		1	1	2	3	3	2	2
06	433	2	2	2	2		4	1	2	4		2	2
06	434	2	2	2	1	3	2	2					
06	435	2	4	2	2		3	2					
06	436	1	1	3	1	3	2	1	2	3	3	2	2
06	437	2	1	3	2		2	1	2	1	1	1	1
06	438	1	3	5	1	2	3	2					
06	439	2	1	3	3		3	1	2	3	1	1	1
06	440	1	1	4	1	3	4	2					

Test Site	Questionnaire Number	Sex	Age	Education	Activity	Employment	Income	Perception	Rating	Experience	Place	Objectionability	Odor Control
06	441	1	1	4	3		4	1	3	2	2	1	1
06	442	2	2	3	1	4	1	1	3	2	2	1	1
06	443	2	2	3	2		3	1	1	4		2	2
06	444	1	2	5	1	1	3	1	1	3	1	2	2
06	445	2	4	3	2		2	1	2	2	3	2	2